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Economy of Acceleration

REMARKABLE figures of time saved in long journeys in South Africa as a result of train acceleration are given in the Annual Report of the General Manager of Railways and Harbours for the year ended March 31 last. They range from 60 min. by the Union Express from Cape Town to Johannesburg to 720 min. by ordinary train from Durban to East London. For through journeys beginning on Mondays from Bulawayo to Port Elizabeth, East London, and Durban as much as 16 hr. 15 min. less is now required, thanks partly to earlier departures and rearranged connections. Accelerated light steam trains, stopping at all halts, sidings, and stations, and dealing with passenger and parcels traffic, were introduced last June on the Kimberley—Klerksdorp section and save as much as 3½ hr. on the journey. Acceleration is the objective of a carefully co-ordinated programme and is reached only after much preparation. Nor is the ultimate speeding up achieved at once; instalments are given as the programme of development, which involves locomotives, permanent way, and operating methods, progresses. One very important benefit of acceleration is the quicker turn-round of rolling stock thus made possible. This factor contributed largely to the success with which the great increase in passenger traffic was met during the year with the provision of only 181 new passenger coaches. Even the greater demand created subsequently by the Empire Exhibition at Johannesburg, which necessitated 120 extra trains in the first three weeks, was adequately met by the intensive use of all available resources. Acceleration of all services to the maximum possible is now the policy of many railway administrations. This policy has been found to possess many advantages not always perhaps foreseen at the outset, such as the better use of rolling stock, the quicker clearance of the track, and last, but not least, the improvement in punctuality and morale that follows when the best is consistently required.

* * * *

The Week's Traffics

Except for the merchandise receipts of the L.M.S.R. and L.N.E.R. and for the passenger train takings of the Southern the traffics of the four group companies for the past week are not encouraging. It is the coal which is mainly responsible for bringing the total increase for the week down to £7,000. In the corresponding week of 1936 coal traffics were £43,500 up. Passenger train traffics to date are £3,049,000, an increase of £47,000, and the merchandise earnings of £3,056,000 show an advance of £50,000, but coal receipts (£2,071,000) are £159,000 down. The best increases so far are the £45,000, or 3·34 per cent., in merchandise on the L.M.S.R., the £24,000, or 3·33 per cent., in passenger train traffic on the Southern, and the £15,000, or 2·80 per cent., in merchandise on the Great Western.

	3rd Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R.	− 2,000	+ 31,000	− 13,000	+ 16,000	− 9,000	− 0·27
L.N.E.R.	+ 4,000	+ 9,000	− 8,000	+ 5,000	− 45,000	− 1·79
G.W.R.	− 4,000	+ 2,000	− 8,000	− 10,000	− 4,000	+ 0·29
S.R.	+ 7,000	− 3,500	− 7,500	− 4,000	− 4,000	− 0·39

Great Northern Railway (Ireland) traffics to date show a decrease of £3,850, mainly in goods, and the Great Southern net increase of £4,922 is entirely in goods.

* * * *

Broadstone for the West of Ireland

An association of very long standing has been broken with the closing from January 18 of Broadstone station, Dublin, which we recorded last week, for Broadstone was once the terminus not only of the old Midland Great Western Railway but also of the Royal Canal, and therefore was the recognised point of departure for the West. The canal was built under the provisions of a Charter of Incorporation granted on October 1, 1789, under the Great Seal of Ireland to the Royal Canal Company. That company was dissolved by Act of 1813 as the provisions of the Charter had been violated, and the property was vested in the Directors General of Inland Navigation in Ireland who completed the canal; it was handed over on May 23, 1818, to the New Royal Canal Company. The Midland Great Western Railway was formed on July 21, 1845, and under its Act of Incorporation took over for £298,059 the Royal Canal—some 96¼ miles of main navigation and branches, said to have cost the original proprietors about £1,500,000. The canal parallels the main railway line from Dublin to Mullingar, and the M.G.W.R. purchase was subject to the obligation of maintaining the navigation and not varying the tolls without the consent of the Lord Lieutenant of Ireland. The Royal was then, and remained, the only railway-owned canal in

Ireland. With the progress of the railway the receipts from the canal fell, and in 1905 the company applied to the Board of Trade for permission to close the great basin at the Broadstone, which was the Dublin terminus of the waterway. The basin was filled in and is now a playground.

* * * *

Overseas Railway Traffics

By the improvement of £129,398 in its traffics for the past two weeks the Buenos Ayres Great Southern has converted its previous decrease of £4,338 into an increase of £125,060. At this time a year ago the company had a decrease of £173,279, but at the present rate of progress it should soon be back again at the figures of 1934-35. The increase on the Central Argentine during the past fortnight has been £93,375, and the gain of £736,611 for the year to date is on top of an increase of £90,100 for the first 30 weeks of 1935-36. An advance of £36,025 in the past two weeks is shown by the Buenos Ayres & Pacific, and one of £27,825 by the Buenos Ayres Western.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
		£	£	£	£
Buenos Ayres & Pacific ..	30th	110,298	+ 17,407	2,440,489	+ 141,386
Buenos Ayres Great Southern ..	30th	229,094	+ 77,390	3,809,509	+ 125,060
Buenos Ayres Western	30th	65,571	+ 14,925	1,358,205	+ 99,723
Central Argentine	30th	185,608	+ 49,042	4,315,167	+ 736,611
Canadian Pacific	3rd	474,200	+ 40,600	1,388,400	+ 144,200
Bombay, Baroda & Central India	31st	307,500	+ 55,500	6,866,175	+ 367,425

The Bombay, Baroda & Central India shows an increase of 5·65 per cent. for the financial year to date.

* * * *

How American Railways Spend Their Incomes

Once again we have received from the Committee of Public Relations of the Eastern Railroads, U.S.A., its annual wall calendar upon which is indicated the distribution of incomes of Class 1 railroads during 1935. The figures are based on statistics prepared by the Association of American Railroads Bureau of Railway Economics at Washington. By far the largest item of expenditure during the year was on wages, which absorbed all the receipts for 164 days, or as the calendar shows it, for the period January to May together with the first fortnight in June. The cost of fuel was 21 days' receipts, materials and supplies 55 days', taxes 25 days', interest and rents 66 days', and other expenses 34 days'. Interest and rents also absorbed the equivalent of a further 16 days' receipts for which 1935 made no provision! This represented a deficit of $118,743,179 on the year's working, and allowed for an average payment of 1·5 per cent. on the capital invested. In an explanatory leaflet which accompanies the calendar we read the somewhat caustic comment, " Of the total railway tax approximately 46 per cent. was applied to the support of schools and 14 per cent. for construction and maintenance of highways."

* * * *

Mysore Railways Annual Report for 1935-36

In his annual report on the administration of the Mysore State Railways during the year 1935-36, the Agent, Mr. H. D. Sinclair, draws attention to the keen competition of roads with railways in the State. To meet this competition, the Railway Department initiated an experimental bus service between Shimoga and Sagar, which has proved a success, and the earnings of the Shimoga—Anandapuram section have considerably improved through the sale of bus-cum-rail tickets. The administration also proposes to run special bus services between Shimoga and the famous Gereoppa Falls, a distance of about 66 miles. The total mileage of Mysore State-owned open lines worked by the Mysore State and by the Madras and Southern Mahratta Railway was 731·86, and the capital at charge amounted to Rs. 619·37 lakhs. The length of lines operated by the State was the same as in the previous year, 460·3 miles. The gross earnings during the year amounted to Rs. 33·26 lakhs as compared with Rs. 31·55 lakhs in the previous year, but ordinary working expenses totalled only Rs. 23·08 lakhs against Rs. 23·26 lakhs in 1934-35. Net receipts, after providing for interest, depreciation, &c., amounted to Rs. 4·45 lakhs, an improvement of Rs. 1·76 lakhs over the figure of the previous year. The report states that goods earnings are recovering from the depth of depression reached in 1932-33, and the reduction of third class fares on certain sections has had a beneficial reaction on traffic. Reference is made to the balance of Rs. 1·70 lakhs outstanding on account of freight and other bills to be paid by the Mysore Iron and Steel Works and other Government departments.

* * * *

The Fastest Long-Distance Train

In the earlier days of high speed diesel enterprise on rails, it was frequently urged by the protagonists of steam that however fast the diesel-driven units might travel, they could never offer the same spacious comfort as the trains hauled by steam locomotives. This was an argument freely quoted at the time when the Silver Jubilee of the L.N.E.R. was introduced. The accelerated schedule of the Union Pacific's City of Denver, set out on page 213 of this issue, is a startling commentary on what has happened in the interim. Here are two twelve-car trains, incorporating the most luxurious sleeping and restaurant car accommodation, each of which covers daily a distance of 1,047·4 miles at a running speed of 67·2 m.p.h. eastbound and 66·6 m.p.h. westbound; included in the eastbound journey is a length of 431·2 miles covered at a booked running speed of 76·8 m.p.h., with two start-to-stop runs scheduled at over 80 m.p.h. Most remarkable of all, perhaps, is the fact that each City of Denver unit covers 7,332 miles weekly—equal to the task of running from London to Aberdeen and back seven times a week. This fact in its turn witnesses to the increase in the daily mileage of stock and of staff which is obtained with the help of high speed.

* * * *

High Speed and Business

It is a matter of considerable satisfaction that in introducing their Coronation service in July next, the L.N.E.R. authorities have decided to provide what is, in effect, an entirely new facility—the late afternoon service for which desire has so long been expressed. In the southbound direction it will be possible for a business man to have a whole morning in which to transact his affairs as far to the north as Aberdeen, and yet, by leaving round about 1 p.m., to be brought to London at 10.30 in the evening; and it is to be hoped that means will be taken to expedite the existing 11.5 a.m. from Inverness and 3.30 p.m. from Perth sufficiently to enable them to connect with the Coronation at Edinburgh, so providing a much-needed fast day service from both cities to London. It is a wise plan to schedule York as the intermediate stop on the northbound journey instead of Newcastle; passengers from London for Tyneside will still enjoy the services of the Silver Jubilee at the more convenient starting hour of 5.30 p.m., whereas the York stop of the Coronation will enable the Leeds business man to leave that city as late as 6 p.m. for Scotland, with similar facilities from other cities in the West Riding. The late evening start of the new Leeds and Bradford high speed service, at 7.10 p.m., will be a novel experiment, though

so far as concerns arrival in Leeds it will be only 10 min. behind the existing 5.50 p.m. express from King's Cross; it is a moot point, however, whether a departure at about 6 p.m. from London, and an earlier arrival in the West Riding, might not prove more popular, as well as causing less disturbance than the later time to the night freight services.

* * * *

French Railway Reorganisation

The additional cost of the 40-hr. week in France is estimated at fr. 1,000,000,000, a figure that will greatly increase the already huge railway deficit. So that even the trade revival, which has already begun, and the reduction of the present high interest rates on long-term loans will do little to ease the burden of the railway debt. So hopeless, in fact, does the position appear that the Government has decided to tighten its control over the railways. The present system of railway administration is to be completely recast, and the railways are to take their place in a general co-ordination of public transport services. A clause in the fiscal reform law of December 31, 1936, provides that the Government must draw up plans for this purpose and submit them to Parliament before March 31, 1937. In the recent parliamentary debates on railway finance, it was pointed out that the scheme for rail and road co-ordination had not yet become effective and more energetic action in this direction was urged. This probably explains recent reports that the P.O.-Midi and the P.L.M. Companies had decided to close sixteen unprofitable branch lines. Because agreement had been reached between the railway companies, the interests using the branches, and the road transport concerns, it was supposed that the closing of the lines was imminent, but inquiry at official sources indicates that the final decision has been postponed. Probably, some local interests are still opposing this step.

* * * *

The Forty-Hour Week on French Railways

The 40-hr. week for all railway workers in France, though it came into force on January 25, is considered as retroactive from January 1, and the number of hours over and above the new legal working day of 6 hr. 40 min. worked by an employee between January 1 and 25, will be credited to his holiday account at the rate of one extra day's holiday for every 6 hr. 40 min. It was at first expected that this new regulation would involve the employment of 60,000 more workers, but the figure will probably not exceed 40,000 in practice. Assurances have been given to the railway companies regarding their reservations concerning the financial effects of the new measure, and certain questions of detail involved in its application. Also it is to be made as flexible as possible, and is, in fact, to be considered as in the experimental stage until the end of May. The new rules lay down that, in the application of the average working day of 6 hr. 40 min., the effective working day, even in isolated cases, must not exceed 8 hr. In exceptional circumstances, however, it may be extended to 8½ hr. once or twice in a busy period, but even then the aggregate number of hours worked in any week must in no circumstances exceed 50. The new regulations are divided into two parts, one applying to outdoor operating staff and the other to office personnel.

* * * *

Route Lever Working for London Transport

On page 196 in this issue will be found a description of the interesting signal cabin at Rayners Lane, L.P.T.B., on the Harrow and Uxbridge line. It is constructed on the route lever principle first tried by the board at West Kensington with satisfactory results. Point levers are provided in the frame, contrary to the practice in France, where route lever working is widely used; the signalman does not operate them for ordinary traffic movements, however, for controlling which the route levers suffice. The object sought has been not so much to reduce the size of the frame—an important point at the large French terminal stations but not in small installations—as to save time and simplify the work to be done by the signalman, for which purpose the design seems admirably adapted, the electric setting and locking circuits allowing a new route to be made behind a train with the minimum of delay. Saving every second in the peak periods has become a pressing necessity of recent years and the route lever principle would seem to be the true scientific method of meeting the need. We believe it will make appreciable progress in this country before long. It was probably an Englishman, C. E. Carr, who made the first proposals for route lever working, with hydraulic apparatus, in 1889, but he had no refinements such as constant detection or track and section locking, essential to the completion of the idea under modern conditions.

* * * *

A Novel Method of Shovel Packing

In another part of this issue we describe an ingenious refinement devised by Mr. T. R. Leonard of the Great Southern Railways (Ireland) for the shovel packing of permanent way, which appears to be giving very satisfactory results. Controversy between the relative advantages of shovel and beater packing is by no means settled yet, but opinion increasingly tends to favour shovel packing, with the proviso that it should not be adopted without the careful instruction and supervision, at any rate in the early stages, of the men who carry out the work. In France, as we have already described in these pages, a system of measured shovel packing is generally used whereby the exact amount of chippings required to restore the track to proper level is accurately measured by means of what may seem to be somewhat elaborate equipment and procedure. The result, however, appears to justify the method, although equally good results can be obtained without such apparatus, but not without careful training and practice on the part of the men. Another essential, of course, is that the men should be provided with the proper tools and material. We commend Mr. Leonard's method particularly to those who still hesitate to replace beater packing by shovel packing.

* * * *

Cheaper G.W.R. Restaurant Service

The introduction on all G.W.R. restaurant car services of " short " luncheons and dinners, at 2s. 6d. and 3s. 6d. respectively, and of an *à la carte* breakfast, is a welcome move towards the flexibility in the tariffs for railway meals which we have often advocated. Such innovations will be all the more approved in that they are accompanied by a greater variety and choice of dishes in the menus. Interest will be added to the prospect of a railway meal by the fact that it is proposed to serve local delicacies, pertaining to the districts served by the trains, where suitable. For example, Cornish cream will be served on certain trains running to Cornwall, and Devonshire cream on others terminating in Devon. Last year nearly a million and a half meals were wholly prepared and cooked on the 108 G.W.R. restaurant cars. English, Welsh, and Scottish meats are used exclusively. The company also operates ten buffet cars, providing an *à la carte* service of hot and cold refreshments.

XUM

The Transport of Exceptional Loads

THE British railways have had a considerable experience of the conveyance and handling of exceptional loads, and each of the four group companies maintains a large number of special types of vehicles specially constructed to facilitate the transport of articles of unusual weight or dimensions, or of bulky objects which require special care in transit. The loading, conveyance, and unloading of heavy pieces of machinery and other exceptional loads necessitates the services of experts, and each company has a staff of men specially trained to supervise all the operations incidental to the safe transport of such loads. In addition, the companies maintain specialised cartage equipment and, together with their associated cartage companies, are able to offer a comprehensive throughout transport service which has proved to be of the greatest assistance to manufacturers. Some of the special wagons owned by the companies have been constructed to carry weights ranging up to 150 tons, and the designs of other vehicles which have been evolved to meet particular requirements enable loads to be conveyed which at first sight might be regarded as being entirely beyond the capacity of the railways to carry. Steel girders up to 120 ft. in length can be conveyed on flat bogie wagons, and similar vehicles fitted with wells enabling articles to be loaded to within a few inches of rail level are continually being used for the transport of castings, ingots, stern frames, granite blocks, &c. Well trolley wagons can also be built up unit by unit as required, and, by the application of the cantilever principle, a 110-ton vehicle can convey a concentrated load of 150 tons by spreading the weight over a combined unit. Propellers ranging from 25 to 80 tons in weight are frequently carried in well trolley wagons, and special side girder trolley wagons are used for the carriage of transformers, stators, and other heavy pieces of machinery up to 120 tons. Bogie trolley wagons of 65 tons capacity have been provided for conveying locomotives to the ports for shipment abroad, and these are constructed so that the engines can be run on and off the wagons.

To facilitate the conveyance of traction engines, steam rollers, and other heavy vehicles, machine wagons have been constructed with ramps at each end. Wagons designed originally for the conveyance of crates of glass are also suitable for the carriage of shop window frames, huts in sections, ships plates, sheet copper, and other similar flat loads up to 35 tons in weight. For the transport of self-contained loads of timber, rails, girders, &c., eight wheeled 30-ton bogie wagons are available, and twin girder trucks, capable of conveying loads up to 70 tons, have been specially designed for the carriage of bridge girders of exceptional length, weight and dimensions, the wagons being capable of extension to over 80 feet. Apart from the diversity of wagons used in connection with such exceptional loads, the companies have constructed a large number of high capacity wagons for dealing with the more general types of traffic. Bogie wagons, for instance, are available for carrying 50 tons, or nearly 20,000 bricks, and bogie covered wagons have been specially designed for the side loading of motorcar bodies. Bulk grain wagons have been introduced which can be loaded speedily through apertures in the roof, and discharged equally quickly through bottom doors, while refrigerated and insulated vans are used for the conveyance of meat, fish and other perishable traffics.

In addition to the rail conveyance, the companies are also able to perform all the services incidental to the dismantling, loading, unloading, road transport, positioning and erecting on site. A few months ago a very large transformer weighing 100 tons was conveyed by rail from Manchester to London, where it was unloaded by special tackle on to a large 32-wheeled motor and trailer. As there was no suitable road over which this unusual load could be conveyed to the actual site, a temporary track of over 1,200 sleepers was laid down over which the delivery was successfully accomplished. Other examples of services which the companies undertake are the lowering of transformers into underground sub-stations, and the erection of lamp-posts in streets. Arising out of the building operations now in progress throughout the country, special rail and low-loading road vehicles have been built for conveying modern building plant such as mechanical excavators. Many factory and building sites are not equipped for unloading such heavy appliances, but the road tractors and trailers, mobile cranes, lifting jacks and tackle, ball bearing platforms and other devices which the companies have at their disposal enable them to offer facilities for throughout transport which are of considerable service to industry generally.

* * * *

Non-Steam International Services

THE fast international diesel trains which, as announced exclusively in our *Diesel Railway Traction Supplement* for October 2, are to begin on February 1 between Paris and Brussels, and a little later between Paris and Liége, will form an appreciable increase in the number of through international railcar services, which at the moment consist only of two trips a day each way between Vienna and Budapest. But the only inter-capital through trains without intermediate stop will still be the steamed-hauled Pullman trains, L'Oiseau Bleu and Etoile du Nord, running between Paris and Brussels over the lines of the Nord and Belgian National Railways. The new diesel trains, although destined to cover the 193 miles between the French and Belgian capitals in 180 min., will make short stops at St. Quentin, Aulnoye and Mons. The service will be operated at first by the new 820 b.h.p. triple-car trains of the Nord. The fast Arpad diesel railcar of the Hungarian State Railways, which has made a return trip daily between Budapest and Vienna for the last two years, starting from Budapest at 7.10 and returning from Vienna at 20.00, is popularly supposed to be a non-stop service, but actually a stop of one to two minutes is made at the frontier station of Hegyeshalom, although no customs examination is made. This car averages 54·9 m.p.h. westbound and 54·5 m.p.h. eastbound inclusive of the brief frontier halt. Since May last it has been supplemented by another service leaving Vienna in the morning and returning from Budapest in the evening, which is worked by one of the Austrian 420 b.h.p. diesel-electric railcars with first, second, and third class accommodation at normal "Schnellzug" fares, but with the necessity of a seat ticket, whereas the Arpad has only one class of accommodation, with a buffet service, and a special fare of 24 pengos westbound and 30 schillings eastbound. The new service takes 225 min. eastbound and 226 min. westbound, including stops at Bruckneudorf, Hegyeshalom and Györ in each direction, and totalling 18 and 19 min. respectively.

Austria and Hungary participate in other services which, if not truly international, involve the running of railcars for a few miles within the borders of another country, such as those from Vienna to Sopron, in Hungary, by the privately-owned Györ-Sopron-Ebenfürt Railway, half of whose property is in Austria and half in Hungary, and the local service of the Federal Railways from Bregeuz to St. Margrethen, in Switzerland, which on occasion proves a quicker route from the Arlberg to the north of Switzer-

land than via the main line to Buchs. On the Hungarian State Railways the Ganz 550 b.h.p. cars run a through service from Budapest to Subotica, 12 miles inside the Jugoslav border, and haul as a normal train up to seven four-wheeled carriages. Yet another service of this kind is the run of the Alsace-Lorraine Railways' Bugatti car into the Swiss station at Basle. A proposal for another railcar-train service with international features is that for a high-speed Schnelltriebwagen to run between Berlin and Königsberg, which would pass over the Polish corridor. Tentative suggestions for this were made by the Reichsbahn early in 1934, and an end-to-end speed of 72 m.p.h. proposed for the journey of 373 miles. Further negotiations are under way, and it is possible that a Fliegende Königsberger may begin to run in 1937.

* * * *

German Locomotive Standardisation

IN the course of an interesting article in the *Henschel Review* entitled "A Survey of the Development of Prussian and German Passenger Locomotives," Herr Rudolf Kreutzer, the author, states that when several German State-owned railways and numerous privately owned companies were merged to form the Royal Railway Administration of Prussia, abbreviated to KPEV, in the early 'eighties of last century, standardisation of locomotives and rolling stock became a necessity. Before this, all the administrations concerned had locomotives built to their own specifications, and as the builders were often given much latitude in designing, it transpired that there were more than one hundred different types of engines in service at the period of amalgamation. The first step was to develop three standard types, which were believed sufficient to cope with the haulage requirements of those days, *viz.*, one for passenger, one for goods, and the third for shunting purposes. A system of classification was introduced at a later date, and these types were described as Classes P_2, G_3, and T_3 respectively. Strictly speaking, however, some of the railways owned by the State of Prussia had introduced what were called *normal lokomotiven* as early as 1877, a few years before the great merging.

The year 1877, therefore, should be properly regarded as marking the origin of locomotive standardisation in Germany. As time went on the number of engine classes was increased, and by 1898 locomotives with six-coupled wheels made their appearance in passenger service on the Prussian State Railways, these being designed on the lines of the engines used on the Northern Railway of France. Upon the merging of the Federal State systems into the Deutsche Reichsbahn, the latter administration immediately introduced a new scheme of standardisation and the first of the new engines made their appearance as early as 1925. In the article it is stated that the initiative of a few men was largely responsible for the evolution and later the rapid development of locomotive practice in Germany, these men being supported by manufacturing firms. This constitutes an indirect tribute to the locomotive manufacturers, and a well-deserved one which we are glad to have the opportunity of endorsing. Very often, too little credit is given to the manufacturers; in this country, of course, where as a rule designs are prepared almost exclusively by the railway companies' own staffs, the quiet and efficient but invaluable services rendered by the manufacturers are apt to be overlooked. In other countries, where it is generally the practice to entrust to the locomotive builders most of the detail work of design, and often the whole design itself from a bare specification, credit is more justly apportioned.

British Locomotives

READERS in all parts of the world frequently consult us on a variety of subjects appertaining to railway operation, and although, more often than not, the information sought has at one time or another appeared in our pages, the demand is consistent and tends to increase. Points of locomotive design and proportions, and the characteristics of the routes on which the engines work, are two subjects respecting which a large volume of enquiries reaches us both by telephone and through the post, and it was partly for this reason that a volume of profile diagrams showing the grading of the main lines in this country was recently published.* The demand for this volume was spontaneous and is, in fact, being steadily maintained, thus demonstrating the value of a compendium of handy size presenting the information required in a convenient form. The frequent enquiries we receive relating to British locomotive types, have led us to believe that the publication in due course of a similar volume giving dimensioned diagram drawings of the various classes of engines in use on the four group railways would be justified. Before, however, proceeding to issue the drawings in book form we have decided to reproduce them serially in THE RAILWAY GAZETTE, starting this week, so that the information may be accessible to all our readers progressively, as well as ultimately to those who wish to possess the whole series between the covers of a book.

It is not proposed to supplement the drawings with photographic reproductions, our purpose being to provide a ready means of finding the leading dimensions or other particulars of locomotives belonging to any of the four main-line railways in the United Kingdom. We have decided to present the drawings of engines in alphabetical order of companies, beginning, therefore, with the Great Western Railway. This, we thought, would be preferable to an order governed by types of engines irrespective of the owning railways, if only because it keeps together all the locomotives designed and built for individual sets of conditions. In selecting the classes of engines to be included, we have had the advantage of the co-operation of the Chief Mechanical Engineers of the railways, and, indeed, without such valuable help it would have been difficult or impossible to make the selection sufficiently representative without entailing the risk of including classes which might soon be placed on the condemned list. All the diagrams are reproduced from official drawings kindly placed at our disposal by the Chief Mechanical Engineers, and the accuracy of the dimensions and other particulars is thereby assured.

In arranging the sequence of types of each company, we have placed express passenger engines first, beginning with the latest and/or largest types, followed by the next group in the passenger sections and so on through the various classifications down to the small locomotives employed in shunting and light services generally. The engine classes represented are currently entered in the books of the companies concerned, and are therefore likely to remain in operation for some time ahead. For purposes of convenience, and with a view to confining the survey to engines belonging to relatively modern types, the year 1923, which marked the grouping of British main-line railways under the Railways Act of 1921, was chosen as the starting point of the period covering the types of locomotives selected, which also include the latest developments on all the railways.

* "Gradients of the British Main Line Railways." Published at 33, Tothill Street, Westminster, S.W. 1. 5s. net.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Safe Vestibules and Couplers

Coll-Earn, Auchterarder,
Perthshire, January 24

To the Editor of The Railway Gazette

Sir,—If there be anything whereof I might boast it is this, that after a long struggle with the Great Northern partner I got the East Coast companies (N.E.R., G.N.R., and N.B.R.) to adopt for the East Coast Joint Stock automatic couplers and vestibules. The Great Northern also held out against bogie stock to the last ditch; but once they found the benefits of auto-couplers and vestibules they put them on their own stock.

That was when I was asked to advise in designing the novel 12-wheeled stock which may be remembered by the big Royal coats-of-arms of Scotland and England which I designed for the panels. My reward came when, in three of four reports, the Board of Trade inspectors said that lives and wrecking had been saved thanks to these vestibules.

Mr. P. C. Dewhurst's photograph on page 134 shows a vestibule only a little better than the "long" British type which he rightly condemns. In the above E.C.J.S. we brought the main underframes and strong walls and roofs right out to meet each other with steel frames and faces at their doors, with no concertina squeegees at all. In a collision this transfers much of the crushing to the upper parts.

Of course this compels the use of automatic close couplers. With buffers you must use concertina vestibules by reason of the telescoping of the buffers. Apart from the saving of time and the lives and limbs of the shunters, automatic couplers have great advantages—even in smashes as the inspectors have pointed out. The whole train is very flexible just like the wooden, jointed snakes of our childhood—stiff horizontally but so flexible vertically that holding them by the tail they could hardly be kept still and seemed alive.

In a buffered train when it goes round a curve a good deal of energy is taken out of the locomotive for two reasons: Firstly, to compress the inner buffers to bend the train; and secondly, because the train being stiff, end to end friction is caused on the outer rail since the bending must be done by the flanges thus giving a braking action, and also wear and tear. Toy trains would never whizz round, nor stay on, such small circles if their coaches were closely buffered up. A centrally-buffered train is flexible like a row of things coupled by strings and therefore can sail round curves easily.

I commend these meditations to my friends of the L.M.S.R. for their new high-speed stock.

I remain,
Yours faithfully,
NORMAN DORAN MACDONALD

Speed

United University Club,
Pall Mall East, S.W.1.
January 18

To the Editor of The Railway Gazette

Sir,—Sir Nigel Gresley is reported in *The Times* as saying:—

British, French, German, and American experience all proved that the high-speed trains had met a clearly defined want. There was little truth in the argument that their patronage had been mainly drawn from other trains; nearly all of them provided additional facilities and had created a traffic of their own.

For half a century some of us have been urging the importance of speed in railway service; but except in the case of a very few enlightened managers, such as Gibb or Inglis, we have been met with contemptuous silence or with a pontifical pronouncement that the public does not care for speed. In this connection perhaps you will allow me to quote from an article which appeared in your paper so long ago as June 9, 1905:—

There is reason to believe that if driven to make a choice the great majority of modern travellers would cheerfully sacrifice comfort and even be willing to risk a certain amount of danger in return for a perceptible increase in speed. It may be true enough that medical science is slowly lengthening the average of human life; but the general spread of education, the press, and all the thousand and one agencies of civilisation have multiplied its interests in an enormously greater degree, and never before in history have men been compelled by want of time to leave undone so many things that are worth doing. Hence the need for rapidity of movement generally, and in particular for the rapid transport of passengers and mails.

Those words are just as true under present conditions as they were at the time when I wrote them. It is to be hoped that the new appreciation of the value of speed will not exhaust itself in providing a few ultra-fast trains at special high fares while leaving a multitude of third rate services unreformed. A single good train like the Bristolian is a poor compensation for the present service between Paddington, Birmingham, Chester, and Birkenhead; (compare the running of the existing trains north of Birmingham with that of the old 4.45 p.m. from Paddington 57 years ago). And the distance between London and Perth is not very different from that between New York and Buffalo; New York and Pittsburgh; or Chicago and St. Paul; and while it might be unreasonable to ask for a Scotch Hiawatha it is equally unreasonable that the only daylight train from Perth to Euston should continue year after year to waste 10 full hours on the journey.

Many of our train services need to be entirely replaced; and at last some attention should be given to Sunday services generally. Anyone who has returned by train to London from the coast on a fine Sunday evening in the summer will realise the truth of this!

Yours, &c.,
W. B. THOMPSON

North-East London Electrification

The Railway Club,
57, Fetter Lane, E.C.4
January 22

To the Editor of The Railway Gazette

Sir,—I notice in your account of North-East London railway developments that it is proposed to electrify the line from Fenchurch Street to Stratford on the overhead wire system and operate a shuttle service of eight trains an hour.

This seems to be an extraordinary proposal—surely a steam train could operate such a service quite satisfactorily? But why not let the L.P.T.B. work this line in conjunction with its extensions, by terminating some of the Central London services at Mile End and filling up the gap with trains from Fenchurch Street to Loughton via Stratford? This would at least save some of us a change at Stratford.

Yours faithfully,
D. W. O'DWYER

Railway Demonstrations for Schoolchildren.—Railway demonstrations for schoolchildren have become very popular all over the country, but few people realise that Leeds is the home of such demonstrations as they were first organised by the L.N.E.R. in that city. In conjunction with the Leeds educational authorities, the L.N.E.R. is arranging for another schoolchildren's demonstration to take place from February 22 to 26 next. It is hoped during this demonstration to have one of the streamlined engines which will haul the Leeds and Bradford streamlined express when it begins to run in the autumn. Over 1,000 children will be taken on the footplate of this engine and given an insight into the working of the controls.

PUBLICATIONS RECEIVED

Garcke's Manual of Electrical Undertakings and Directory of Officials, 1936-37 Edition. Edited by Frederick C. Garrett. London: Electrical Press Limited, 13-16, Fisher Street, W.C.1. 8½ in. × 5½ in. × 3 in. 2,078 pp. Map supplements. Price 37s. 6d.—Garcke's Manual has been recognised for so many years as an invaluable occupant of the reference shelf that the appearance of a new edition is always welcome. The present, which is the 39th volume, provides once again a record of all available technical, financial, and commercial information of electricity supply undertakings in Great Britain and throughout the British Commonwealth. The latest available accounts for 1935-36 are included, and in other respects the statistical data have been revised according to the most recent information. Particulars not elsewhere obtainable include, in respect of every supply undertaking, the extent of the authorised area, population, number of premises in area and rateable value. Other exclusive features comprise a directory of approximately 13,000 directors and officials, giving names, addresses, and appointments; and a directory of approximately 6,000 electrical contractors alphabetically arranged under towns, etc., which serves also the purpose of a gazetteer of supply areas.

The manual also deals in an equally comprehensive manner with electric railway, tramway, and trolleybus systems, electrical manufacturing companies, and investment trust and allied concerns. Over 5,000 undertakings in all are recorded. The "Progress of the Year" section, on pages 9 to 40, contains many statistical data on the financial and technical progress of the industry over a number of years.

Matthew Boulton. By H. W. Dickinson. Cambridge: At the University Press. London: Cambridge University Press, Fetter Lane, E.C.4. 9½ in. × 6¼ in. 218 pp. Illustrated. Price 10s. 6d. net.—Probably most people know the name Matthew Boulton as that of a shadowy figure who was the senior partner of the famous eighteenth-century engineering firm of Boulton & Watt. It is realised that, without Boulton's enterprise, Watt could hardly have succeeded as he did; but Boulton's association with Watt and the steam engine is not his only claim to fame, as Mr. Dickinson shows in this volume. The present author made extensive researches into the careers of the famous partners in connection with his biographical work "James Watt: Craftsman and Engineer" which was published last year, and reviewed in our issue of January 24, 1936. He then determined to do justice to Watt's partner, and the volume now under review has resulted.

Boulton was born in 1728 at Birmingham (September 3 old style or September 14 new style) and his whole career was concerned with that city, of which he became a prominent and public-spirited citizen. His father had a toy-making business, one of the principal products of which was buckles for shoes and knee-breeches, and there is a tradition that the original premises were on a site now covered by Snow Hill station, G.W.R. Matthew entered his father's business at the age of 17 and was made a partner when he reached his majority. Both his father and his wife died when he was 31 (in 1759) and the period until 1768 when he was 40 and first met James Watt was one of manufacturing expansion in which he proved himself a craftsman of great artistic ability, and an industrial organiser of genius. It was not until 1774 that Boulton acquired Dr. John Roebuck's interest in Watt's steam engine patent, and in the following year, when a 25-year extension of the patent was granted, the firm of Boulton & Watt came into existence as a partnership for the life of the patent. Boulton was concerned, however, in more than a dozen businesses, either as proprietor or partner, of which the steam engine was but one. The present volume—the first devoted exclusively to Matthew Boulton—shows its subject in a well-balanced light as an outstanding figure in eighteenth century industry, and is a welcome addition to the biographies of those that played prominent parts in the early days of the industrial revolution.

A Handbook of Home-Grown Timbers. (Forest Products Research, Department of Scientific and Industrial Research.) London: H.M. Stationery Office. 9¾ in. × 6 in. 47 pp. Stiff covers. Price 1s. 6d. net.—This small but valuable handbook has been prepared by the Forest Products Research Laboratory at Princes Risborough, and is virtually a revised edition of "The Uses of Home-Grown Timber," which was published in 1927. The revision represents the result of the investigations since carried out at the laboratory. A general description is given of each timber, together with notes on its seasoning, mechanical properties, natural durability, preservative treatment, woodworking qualities, liabilities to attack by various insects, and a summary of its uses.

Butterley.—Under this simple and effective one-word title, the Butterley Co. Ltd. has issued a fascinating brochure replete with illustrated details of the many-sided activities of this famous firm during its life to date of nearly a century and a half. The Butterley Company was founded in 1790 as a partnership between Benjamin Outram, William Jessop, Francis Beresford, and John Wright, to operate coal workings on the Butterley Hall Estate, and two years later the Butterley Ironworks were erected. The undertaking has been so prominently associated with railways from early days that it is a pity this booklet adds to the many undoubtedly legitimate claims of the company the apocryphal stories of the standard 4 ft. 8½ in. gauge having resulted from the width of Derbyshire carts, and of the invention of the flanged railway wheel by William Jessop.

The present scope of the company's activities is adequately portrayed by means of a well-produced series of half-tone illustrations. Constructional steelwork ranges from the roof of St. Pancras station to the railway bridge over the river Godavari in India, which comprises 56 spans of 150 ft. each. Steel containers for door-to-door transport, and all-steel lorry bodies are other interesting features of the booklet. The Bricklayers' Arms goods shed of the Southern Railway—the largest in the world—is shown in course of construction, and a locomotive turntable for the L.M.S.R. is seen assembled for testing. These are but specimens of nearly ninety pictures reproduced in this catalogue.

The Study of Welds and Weld Metal. Publicity Department, Murex Welding Processes Limited, London, E.17. 7 in. × 9½ in. 30 pp.—This pamphlet is the latest of a long list of publications by the above company, giving interesting information on the metallurgical study of welds and welding methods. The excellent micro-photographs will greatly assist in popularising the subject.

Winter Sports.—A nineteen-day winter sports tour to the Arctic Circle, for £29 1s. inclusive, is offered by the American Express Co. Inc., 6, Haymarket, London, S.W.1. Participants cross from Hull to Helsingfors, proceeding by sleeping car train to Rovaniemi, where a modern hotel has lately been built. The folder giving details of this facility also sets out the company's arrangements for winter sports holidays in Switzerland, Austria, France, Germany, Norway, and Sweden.

Electrical Equipment.—The English Electric Co. Ltd. sends several publications dealing with fuses and electric motors. Catalogue No. Q63B gives technical data, with short-circuit test oscillograms, of high rupturing capacity non-deteriorating fusegear. These fuses are of the cartridge type, and have proved themselves very reliable in providing protection for substation distribution networks and industrial equipment. Two pamphlets, Nos. Q96A and Q47A illustrate and describe respectively J-type link disconnecting box fuses, and pole-mounted fuse units for electricity distribution in rural areas. Publication No. T. 14 is devoted to a range of silent and super-silent motors and motor-generator sets. This equipment is in three ranges, namely: super-silent fractional horsepower motors for refrigerators and domestic purposes; silent and super-silent lift motors, from 6 h.p. up to about 30 h.p.; and continuously rated motors and motor-generator sets of all sizes.

XUM

THE SCRAP HEAP

" The Great Western Railway made a record last year by running the Atlantic Coast Express to Exeter, 171 miles, in 3 hours 7 minutes," says a writer in the *Sunday Dispatch*. Not without the knowledge of the Southern Railway, we hope.

* * *

SIR JOHN ASPINALL—1851-1937

Age	*Position*
18	Pupil, Crewe Works, L.N.W.R.
22	Assistant Manager, Steel-making Plant, Crewe Works.
24	Works Manager, Inchicore, Great Southern & Western Railway, Ireland.
32	Locomotive Carriage & Wagon Superintendent, Great Southern & Western Railway, Ireland.
35	Chief Mechanical Engineer, Lancashire & Yorkshire Railway.
48	General Manager, Lancashire & Yorkshire Railway.
58	President, Institution of Mechanical Engineers.
68	Director, Lancashire & Yorkshire Railway.
68	President, Institution of Civil Engineers.
69	Consulting Mechanical Engineer, Ministry of Transport.
74	Consultant to General Manager and Board of London Midland & Scottish Railway.

* * *

It does not often happen that railway tickets bear the wrong date of issue, but an interesting example has recently been sent to us by a correspondent at Hale, Cheshire. It is a third-class cheap single ticket " available on day of issue only " from Hale to Manchester (Central) via Altrincham issued by the Cheshire Lines Committee, and as it bears the date " January 12, 1938 " the unlucky purchaser has his investment tied up for a year if the regulations printed on the face of the ticket are strictly adhered to.

* * *

PRIMITIVE SNOW PLOUGH

A plan is used on the Eastern Counties Railway which, if more generally adopted, would prevent much of the delay that often occurs upon railways at this season of the year. Whenever there is a fall of snow an engine is employed during the night to sweep the rails with brooms attached to the front of the engine, so that the rails are free from snow by the time the morning trains commence running. In consequence of this arrangement no detention of trains has occurred on this line during the present winter.—*From the " Essex Herald " of January 29, 1842.*

* * *

A Montreal Correspondent reminds us that it was 57 years ago—on January 29, 1880, to be precise—that a team of horses hauled a freight train of several cars across the ice bridge the ground of shock caused to her nervous system."

Company's trans-St. Lawrence route. Laying of the rails began on January 9 and it was therefore only 20 days later that service was put in operation. On January 30, the horse-drawn freight was replaced by a 50,000-lb. steam locomotive. The engine continued to haul freight across the ice bridge from the foot of Dezery Street until the beginning of March, when the ice began to soften. Horses then replaced steam locomotives until April 1, when the rails were removed.

In the following year service started a few days earlier, but, due to the mild weather, the locomotive slowly sank into the ice. The rails were removed and another bridge was built about 150 ft. above the first location. Although there was no loss of life when the engine went through the ice, operators of the service took no chances and horses were used until March 8 when the rails were again dismantled. Apparently the trans-river service was found to be impractical, for operations were not resumed in 1882.

* * *

Just 100 years ago the news of his father's death did not reach John Quincy Adams in Washington D.C., for five days. Special arrangements were made to speed the statesman home; they whisked him as far as New York in 45 hours. " He made six changes of conveyance *en route*," the historian relates. " His own carriage took him " to Baltimore, a steamboat from Balti- " more to Frenchtown to the head of " Chesapeake Bay, a stage-coach to " Newcastle, Delaware, a boat from " that place to Philadelphia; a stage " from thence to New Brunswick, at " which place he took a steam-boat to " New York City."

Today Mr. Adams could buy a ticket for $4·55 and leave any hour between dawn and midnight to ride the 226½ miles to New York in less than four hours!

To enable any citizen to do this, the railway built in Washington a terminal costing $16,308,277·01 (the one cent on the official figure attests the statistical exactitude of railroads); the Pennsylvania has bored tunnels under Baltimore costing $7,500,000; has spent $25,000,000 for a new station and tracks to facilitate his ride over and around parts of Philadelphia; has dug deep beneath the Hudson River and East River a 7-mile tube, and erected a world famous station in New York, which entire improvement cost $125,000,000.

Of course, these are only a few major items; the complete accounting to make possible this one 226-mile run at high speed, safety, and comfort would have to include costs of trains, locomotives, rights of way, roadbed, and maintenance.

Then the Pennsylvania spent $100,000,000 for the electrification of its line between Washington and New York.

Even had the knowledge been available in John Quincy Adams's time, the entire national debt of 1826 would not have been enough to defray the cost of electrification. — *From " The National Geographic Magazine."*

* * *

THE EVIL THAT MEN DO

Mr. E. P. Leigh-Bennett, writing in the Southern Railway quarterly *Over the Points*, delivers what he describes as a " pie-jaw " on certain misdeeds to which many travellers incline. Opening carriage doors and alighting while a train is in motion are specially referred to, as being " the chief causes of accidents in any given year." Mr. Leigh-Bennett continues: " Yet it is a pound to a shilling that a dozen men will do it again almost immediately after reading this. And that is a safe bet if ever there was one." We are inclined to agree with him, for to remain seated during the last expiring

A warning to passengers, as interpreted by an artist in " Over the Points "

seconds of a journey calls for phenomenal self-control. We would qualify our remarks by adding that in our own case this applies particularly to the journey home. In the reverse direction, we are inclined to cling desperately to the shelter of the compartment, admiring, but not seeking to emulate, those ardent beings who cluster round the doors with manifest impatience for all that stands between them and the trivial round, the common task. While the railway has to contend with passengers who are careless of their own safety, it is also faced with the claims of those who seek to make capital out of other people's misfortunes. We must concede a grudging admiration to the audacious optimism of the following, quoted by Mr. Leigh-Bennett: " Mr. A puts his bag down on the terminal concourse and goes to the bookstall. Mr. B steps backwards against it, *wallop!* and claims damages from the company for negligence. Mrs. C witnesses from her carriage window an accident on the platform caused by a passenger's carelessness. She claims damages from the company on the ground of shock caused to her nervous system."

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Summer Train Services

In anticipation of a heavy passenger movement to the hill, seaside, and lake resorts during the summer holiday season, most of the railways have incorporated in their summer timetables augmented services and accelerated timings.

Central Argentine Railway

The running of the daylight express, El Serrano, from Buenos Aires and Rosario to Cordoba, which, when introduced last summer as a bi-weekly service, proved very popular, has been extended this summer to four days a week in each direction, leaving Buenos Aires on Mondays, Wednesdays, Fridays and Saturdays at 7 a.m., and Rosario at 11.20 a.m., arriving at Cordoba at 5.20 p.m., and connecting there with the State Railways railcar service to the hill stations as far as Capilla del Monte, leaving Cordoba at 5.40 p.m. This permits passengers to any of the points on the State Railways to reach their destination in time for dinner. The corresponding return service leaves Cordoba on Tuesdays, Thursdays and Saturdays at 12.45, arriving at Buenos Aires at 11 p.m., and on Sundays at 2 p.m., arriving at Buenos Aires at 0.15 a.m. on Mondays. The foregoing timings are an acceleration of 1 hr. 30 min., as compared with last year's schedule.

The price of the first class return tickets from Buenos Aires is $50.00, and second class $28·00, the distance being 430 miles. A Pullman coach is attached to the train, for which an additional charge of $6·00 each way is made from Buenos Aires, and $5·00 from Rosario and intermediate points. There is a dining car service for both first and second class. Tickets are available for return within 30 days. In addition to the regular night express to Cordoba, there will be an extra express on Mondays, Wednesdays and Fridays, from December 21 to January 22 (excepting Christmas Day, New Year's Day, and January 6), leaving Buenos Aires at 7.10 p.m. and arriving at Cordoba at 7 a.m. next morning, combining with the State Railways railcar service to the hill stations.

B.A.G.S. Railway

On the Mar del Plata route the number of day expresses, composed of Pullman cars, first class saloons and dining cars, has been augmented and the trains have been accelerated. One, the Aguila del Mar (The Sea Eagle) covers the distance of 248 miles in 5 hr. 50 min., with one intermediate stop, as compared with 6 hr. 17 min. last season. An evening express, the Golondrina (the Swallow) leaves Buenos Aires every day (except Sundays) at 6 p.m., arriving at Mar del Plata at 11.40 p.m. To cope with the week-end rush, an additional express, the Aereolite, will run every Friday evening, on and after January 8, leaving Buenos Aires at 6.55 p.m., and arriving at Mar del Plata at 0.35 a.m. (Saturdays). The services to other holiday resorts have also been speeded up. The time for the night express to Miramar (280 miles) has been reduced by 1 hr. 30 min.; the run to Necochea (327 miles) by nearly an hour, and to Tandil (205 miles) by 1 hr. 5 min.

To the Argentine Lakes

The summer service to Bariloche and the Argentine lakes has also been improved, in combination with the State Railways. There are now two night expresses and a day express weekly in each direction, instead of 3 night trains, in addition to the ordinary train leaving Buenos Aires every Sunday and returning from Bariloche on Wednesday. The night expresses leave Buenos Aires on Tuesdays and Thursdays at 8.15 p.m., arriving at Bariloche at 9.30 a.m. on Thursdays, and 10.50 a.m. on Saturdays. The new day express runs on Sundays, leaving Buenos Aires at 8.10 a.m. and arriving at Bariloche at 8.50 p.m. on Mondays. One of the return night expresses leaves Bariloche on Saturdays at 8.10 p.m., arriving at Buenos Aires at 11 a.m. on Mondays; the other leaves on Thursdays at 9 p.m., arriving at Buenos Aires on Saturdays at 11 a.m. The new return day express leaves Bariloche on Tuesdays at 10.15 a.m., arriving at Buenos Aires on Wednesdays at 11 p.m. The distance is 1,080 miles. The first class return fare from Buenos Aires to Bariloche is $135.85, and from Bahia Blanca, $109.85; bed tickets are extra.

Reductions in Suburban Fares

The B.A.G.S.R., like the B.A. Pacific and Central Argentine Railways, is taking active steps to combat road competition within its suburban zones by reducing fares, extending the validity of return tickets, and augmenting its local services. The new summer timetable provides for substantial reductions of up to 47 per cent. in the price of single, return and *recreo* (holiday) tickets within the suburban zones of Buenos Aires and Bahia Blanca, and between Neuquén, Contraalmirante Cordero, and Chichinales. Suburban return tickets are now available for 4 days, and *recreo* tickets until 12 p.m. on the day following the date of issue. Tickets purchased on Saturdays and Sundays or on the eve of a holiday, are valid until the last train on the following Monday or on the first working day after the holiday.

B. A. and Pacific Railway

This company is running during the summer season three trains a week, connecting with the Transandine and Chilean State Railways, leaving Buenos Aires at 11 a.m. on Mondays, Wednesdays, and Fridays, and arriving at Santiago or Valparaiso on the following day before midnight. The special return fares (including sleeping accommodation between Buenos Aires and Mendoza both ways) for the whole ticket to Santiago or Valparaiso is $204·00, and half ticket $117·00. The following specially-reduced return fares are in force between Rosario and Cordoba and Santiago and Valparaiso: From Rosario, whole ticket, $173·00, half-ticket $89·00; from Cordoba, whole ticket $159·00, half-ticket $82, exclusive of sleeping accommodation. (N.B. The present free rate of exchange of the Argentine peso is $16·11 to the pound sterling, or 80 cents to the shilling.)

More Diesel Railcars for State Railways

In order to facilitate tourist traffic to the Southern lakes, the Government has issued a Decree authorising the State Railways to purchase two diesel railcars for the service between Patagones and Bariloche, at a cost of $900,000 paper.

The Transandine Railway

A Bill to authorise the Argentine Government to purchase the Transandine Railway, which would then be incorporated in the State Railways system, has been introduced into the Chamber of Deputies by Señor Boatti. The conditions of purchase would be drawn up by the National Railway Board, and then referred to Congress for approval.

INDIA

Railway Inquiry

Sir Ralph Wedgwood and the members of his committee are now at Calcutta, engaged in interviewing the Agents of the East Indian, Eastern Bengal, Bengal-Nagpur and Assam-Bengal Railways. The oral examination of the agents follows documentary replies to a questionnaire drawn up by the committee and circulated to the various railway administrations for the purpose of eliciting detailed information on important questions of management. The subjects on which the agents are required to furnish information are: relations between the Railway Board and the different railway administrations; the work of the Accountant's Department; selection, training and promotion of staff; the relative merits of the divisional and departmental systems of organisation; the possibilities of development of the Commercial Depart-

ment; the system of railway rates; public relations; the preparation of the Budget; and measures to effect economy and to improve revenue and road competition. The chambers of commerce and similar organisations will also be afforded an opportunity of acquainting the committee with their views on railway administration.

Department of Communications Wanted

One of the resolutions adopted by the Associated Chambers of Commerce in December last urged expedition in the creation of a Department of Communications in the Central Government, such department to include railways, roads, civil aviation, and posts and telegraphs, but exclude inland water transport and central shipping. The mover of the resolution stated that a similar resolution was carried at the annual general meeting of the associated chambers held in 1934, and the Government of India had accepted the principle of bringing communications under one portfolio. No advance had since been made in this direction, though the Government of India convened a meeting of representatives of port trusts, chambers of commerce, and industrial and shipping interests in December, 1935. The present proposal to exclude shipping and inland water transport from the Department of Communications arose from a growing feeling that when the interests of the railways were in conflict with those of water transport, the latter had been subordinated to the former.

Reasons for Exclusion of Shipping

It was claimed that shipping interests championed by a separate department in the Government of India, would receive greater attention. The continued attempts of the railways to compete with shipping for port-to-port traffic and the re-imposition of the railway freight surcharge on bunker coal occasioned these misgivings, though it was generally felt that it should be possible for railways and shipping to come to some arrangement equitable to both, which would enable them to give the public efficient and economical transport, and at the same time ensure a discontinuance of the present rate-cutting policy which must be having a very bad effect on railway finance, as it had on the finances of the shipping companies and port trusts. Although the resolution was unanimously carried, some chambers were opposed to the exclusion of inland water transport from the proposed Department of Communications.

"Dumping" of Steel in India

In another resolution, the Associated Chambers of Commerce viewed with alarm the uneconomic competition to which the heavy engineering industry in India was subjected by the import of steelwork, rolling stock, machinery, and other manufactured products at subsidised, compensated or dumping prices which, sometimes nullified entirely the protection intended to be afforded by protective duties. The associated chambers, therefore, requested the Government to mitigate the crippling effect of this form of competition on the industry by every means in its power, and particularly by allowing a greater preference under the store purchase rules to goods of Indian manufacture where the general price levels pointed to such competition.

UNITED STATES

Line Abandonments Continue

Lines abandoned during 1936 totalled 1,519 miles, whereas only 93 miles of new line were completed (according to the compilation of our American contemporary, the *Railway Age*). The lines abandoned were those with extremely light traffic, and this action was induced by road competition and by the exhaustion of natural resources, principally forests, which the lines were built to serve. There were few engineering works of great consequence undertaken during the year, excepting those in connection with the elimination of level crossings, which were paid for in large part by tax monies.

Preliminary Estimates for 1936

A preliminary survey of traffics and receipts for the year shows an increase in freight traffic (ton-miles) of 18 per cent. over 1935, and of 19 per cent. in passenger traffic (passenger-miles). Operating revenues rose 16 per cent. to £800,000,000, while operating expenses increased 13 per cent. Net railway operating income (after taxes but before bond interest) totalled £129,000,000, an increase of £29,000,000. Net income, after all charges, totalled about £30,000,000, as compared with only £1,500,000 in 1935. All in all, 1936 was a year of most satisfactory progress, although, it is to be noted, net income in 1930, the first year of the depression, was almost £100,000,000; so that the road to complete recovery is still a long one.

Supplemental Freight Charges Eliminated

The Interstate Commerce Commission a few days before Christmas handed the railways an unwelcome surprise in a refusal to allow the continuance beyond December 31 of the temporary supplemental freight rates, the existence of which throughout 1936 accounted for most of the net income the railways earned. Actually, net income, after the payment of interest on bonded indebtedness, is estimated at £30,000,000 for the year, whereas the supplemental charges totalled about £24,000,000.

Hearings on a proposed general revision of the freight rate structure began before the commission in Washington on January 6, and, if the railways are successful with their proposals, their freight revenues will be increased. For the commission temporarily to order lower rates, and subsequently to permit increases, appears illogical. However, that body has definitely stated that its action in suspending the temporary supplemental charges will not be prejudicial to upward adjustments if the railways can make a case for them. Two of the commissioners, Messrs. Mahaffie (B.C.L., Oxon., incidentally) and McManamy, dissented from the majority decision, contending that the supplemental charges should have been retained; that the 2½ per cent. per annum the railways earned in 1936 on their property investment was insufficient to enable them to rehabilitate their properties; and that efficient railway service was more important to the country than the exact level of rates.

The majority, however, were, apparently, influenced by the fact that lower passenger fares, which the commission established in the East despite railway protests at the beginning of last summer, brought increases in railway revenues; and that, quite possibly, the removal of the supplemental freight charges might have the same effect. The supplemental freight charges, however, were not applied to traffic competitive with the road, whereas almost all passenger traffic is competitive, so the analogy is not close. At any rate, no definite knowledge of the result will be available until January figures are made known.

Possible Further Electrification by the Pennsylvania R.R.

It is persistently rumoured, but not as yet confirmed, that the Pennsylvania Railroad is contemplating the extension of its electrification from Paoli (20 miles west of Philadelphia) to Harrisburg, an 84-mile section of the main line from New York to the West. The existing electrification extends westward only to the limit of the Philadelphia suburban zone at Paoli, necessitating a change of engines on east- and west-bound trains at that point. Apart from the satisfaction which the company takes in its electric operations so far completed, there would be a saving in time and expense if the Paoli engine change could be eliminated.

Hope for Peaceful Solution of Labour Disputes

The railway labour executives have announced their intention of pressing vigorously for the 6-hour day and other "make work" legislation at the session of Congress now at hand. However, there would appear to be some hope of avoidance of a political battle on at least some of these proposals, in conferences between the labour executives and railway managements which began on January 7 at the instance of President Roosevelt. The President has specifically asked the parties to confer on the railway pension situation, at present under litigation in the courts, with the outcome still uncertain. It is not by any means clear that the existing legislation will be up-

held by the courts, and meantime, on many railways superannuated employees are being retained in service, to their own and the railways' disadvantage, while depriving younger men of employment. It is possible that, by making concessions where concessions are clearly in order, the managements may secure modification of some of the more unreasonable demands of the unions. At any rate, as the President has given his support to collective bargaining as opposed to legislation, it would appear that the unions' case before Congress would be materially weakened if they should press legislative measures without a prior attempt at negotiation.

CHILE

Increase in State Railway Tariffs

The higher tariffs on the State Railways (announced in THE RAILWAY GAZETTE of November 27) came into force on December 16. The increase, which is 10 per cent. on passenger, luggage and goods rates, does not apply to week-end tickets between Santiago and Valparaiso.

Bonus for Railway Employees

The Minister of Production has signed a Decree, authorising the General Manager of the State Railways to pay the employees a bonus equal to 15 days' salary and wages, from the profits of the railways during the present year. The total amount involved is 5,300,000 Chilean pesos, approximately equivalent at current exchange rates to £56,000.

SOUTH AFRICA

Record Revenues

Several new revenue records have been established in recent weeks. The previous record of £667,849 earned in the week ended December 14, 1935, has been surpassed on three occasions in December, 1936, the highest level being during the week ended December 12 when the total of £692,349 was reached.

Report of the Controller and Auditor General

The audited figures for the year ended March 31, 1936, show that the operating expenses increased by £1,316,394 or 7·18 per cent. as compared with the previous year and the revenue increased by £3,028,039 or 11·21 per cent. The operating ratio was 65·40 per cent. compared with 67·88 per cent. the previous year.

The profit on road motor services was £66,866 compared with £59,157 in 1934-35. Of the 98 area services, 76 showed a profit of £73,233, the remaining 22 services showing a loss of £5,465. A loss of £767 was incurred on surplus vehicles account. On grain elevator working there was a profit of £7,460 compared with a loss of £39,475 in 1934-35. The net profit on publicity, bookstalls, advertising and automatic machines was £21,050, an increase of £2,236. The profit on bedding services increased by £340 to £12,334.

Special Service Battalion

The Special Service Battalion catering school at Roberts Heights, Pretoria —referred to in THE RAILWAY GAZETTE of October 19, 1934, and June 7, 1935 —was visited recently by Cav. H. Pittolo, Manager of the L.M.S.R. restaurant at the Empire Exhibition, when the boys were addressed on the duties of a steward, the correct manner of waiting at table and other similar duties. At present there are seventy boys in the class, thirty are out on probation, and the demand for trained stewards so far exceeds the supply that an extension of the training and facilities is contemplated by the railway administration in the near future.

SPAIN

Intervention in Civil Industries by Valencia Government

The Government of Valencia has issued an official note referring to civil industries. No specific mention is made of railways, but the note states that the Government has been considering the question of the present chaotic state of civil industry in general. The working classes, the note says, faced with the "Fascist" rising, were forced to improvise a new economic organisation, but this improvision, under the stress of war conditions, has led to a state of things which can only be described as chaotic. This is now manifesting itself in the form of constant demands from the workers' committees for financial backing, and, if the Government is to provide this backing, obviously it must also have a due intervention in the conduct of each industry. Among the industries so to be submitted to intervention there are many foreign concerns which, "given the present delicate circumstances of the international horizon," cannot be wholly taken over, but even these must be submitted to a prudent intervention. The Minister for Foreign Affairs is therefore preparing the necessary legislation to give effect to this intervention, as well as to regulate the economic assistance.

Analogous Catalonian Decree

This proposed measure of the Popular Front Government follows closely in principle the Decree of October 28 of the Generalitat of Catalonia, which eliminated "income not derived from labour," and set up an elaborate system of collectivisation of industry. Article 37 of the Catalonian Decree also provides for special consideration for foreign interests.

It now remains to be seen how the principal railways will fare, seeing that at present they are already subject to intervention by the State under the Madrid Decree of August 3. (This Decree was fully explained in THE RAILWAY GAZETTE of August 28 last.) But it is by no means certain that the Generalitat of Catalonia will continue to recognise the validity of that Decree in Catalonian territory. At present the through services are working smoothly enough by mutual agreement between the different unions and syndicates, and it remains to be seen if the Governments in Valencia and Barcelona respectively will be able to exercise in the industrial sphere a control that so far they have not succeeded in enforcing in other directions.

MANCHUKUO

Important New Through Route

As soon as next spring's thaw sets in, the construction of a new bridge over the Yalu River will be begun, and is expected to be completed by the end of 1939. Its completion will enable the projected Meihokou—Chian Railway, which will traverse the Tungpientao District and the Provinces of Fengtien and Antung, to be linked up with the Chosen (Korean) Railways system. The opening of this new line and bridge will provide a third and inland through route connecting Manchukuo and Chosen, and a rich mineral area will be tapped and exploited by the establishment of a heavy industries zone under the joint auspices of the two Governments.

CHINA

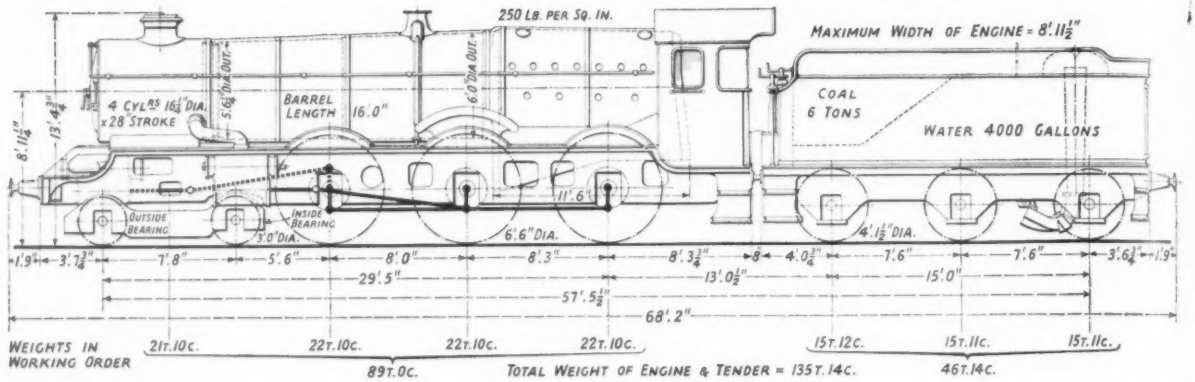
Lung-Hai Railway Extensions

The Sian-Kuichen (Meihsien) extension was opened for traffic on November 1, and the further extension from Meihsien to Paochi is rapidly being constructed. It is 20 miles in length and should be ready for opening very shortly. Paochi is about 90 miles west of Sian and will be the junction where the lines (*a*) to Tienshui and Lanchow, and (*b*) to Chengtu, capital of Szechwan, bifurcate. The two alignments beyond that point are now being surveyed.

Projected Yangtze Bridge at Hankow

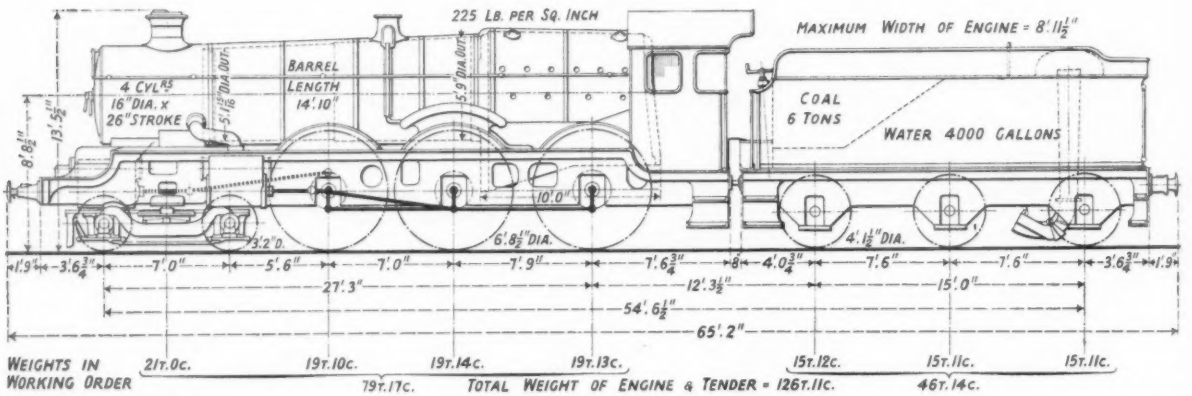
Though Hankow is 700 miles from the mouth of the Yangtze, ocean-going steamers can navigate the great river as far inland as that city. River steamers ply beyond, and so a bridge to span the Yangtze even just above Hankow need only have headway for river craft. The great projected bridge to link up the Peiping-Hankow and Canton-Hankow trunk lines—and thus complete rail communication from Peiping in the extreme north, to Canton, in the extreme south—is therefore expected to be sited with its northern approach at Hankow and southern between the Snake and Turtle hills in Wuchang, the northern terminus of the Canton—Hankow line. The bridge, which is roughly estimated to cost $10,000,000, will be for road as well as rail traffic.

British Locomotive Types—I



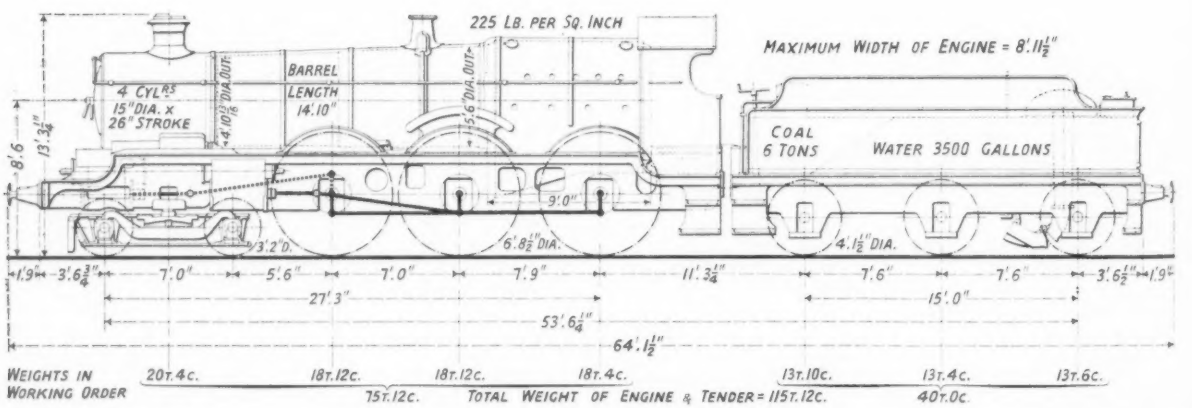
HEATING SURFACE, TUBES—		SUPERHEATER	313·0 SQ. FT.
LARGE AND SMALL	2,007·5 SQ. FT.	COMBINED HEATING SURFACES	2,514·0 ,,
FIREBOX	193·5 ,,	GRATE AREA	34·3 ,,
TOTAL (EVAPORATIVE)	2,201·0 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	40,300 LB.

"King" Class


225 LB. PER SQ. INCH
MAXIMUM WIDTH OF ENGINE = 8'.11½"
4 CYLRS 16" DIA. x 26" STROKE
BARREL LENGTH 14'.10"
COAL 6 TONS
WATER 4000 GALLONS
6'.8½" DIA.
4'.1½" DIA.
WEIGHTS IN WORKING ORDER
21T.0c. 19T.10c. 19T.14c. 19T.13c. 15T.12c. 15T.11c. 15T.11c.
79T.17c.
TOTAL WEIGHT OF ENGINE & TENDER = 126T.11c.
46T.14c.

HEATING SURFACE, TUBES—		SUPERHEATER	262·62 SQ. FT
LARGE AND SMALL	1,857·68 SQ. FT.	COMBINED HEATING SURFACES	2,283·00 ,,
FIREBOX	162·7 ,,	GRATE AREA	29·36 ,,
TOTAL (EVAPORATIVE)	2,020·38 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	31,625 LB.

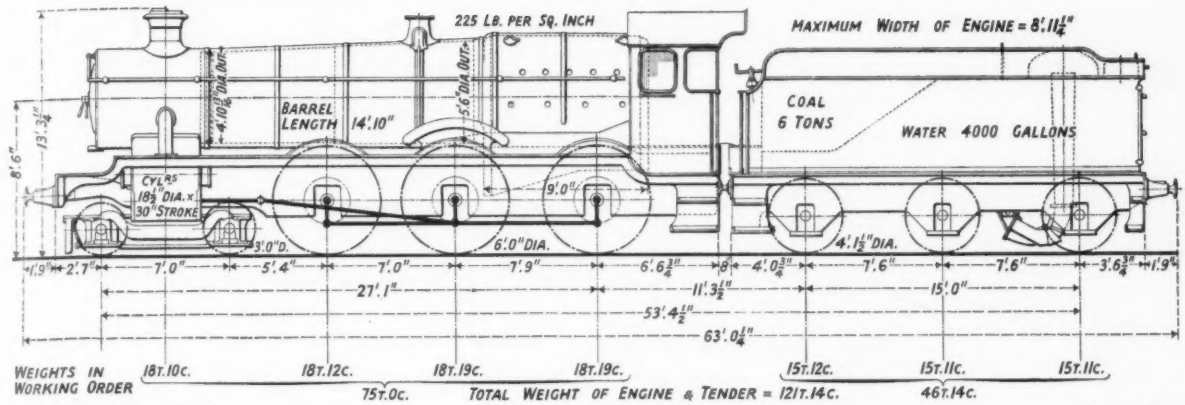
"Castle" Class


225 LB. PER SQ. INCH
MAXIMUM WIDTH OF ENGINE = 8'.11½"
4 CYLRS 15" DIA. x 26" STROKE
BARREL LENGTH 14'.10"
COAL 6 TONS
WATER 3500 GALLONS
6'.8½" DIA.
4'.1½" DIA.
WEIGHTS IN WORKING ORDER
20T.4c. 18T.12c. 18T.12c. 18T.4c. 13T.10c. 13T.4c. 13T.6c.
75T.12c.
TOTAL WEIGHT OF ENGINE & TENDER = 115T.12c.
40T.0c.

HEATING SURFACE, TUBES—		SUPERHEATER	262·62 SQ. FT.
LARGE AND SMALL	1,686·60 SQ. FT.	COMBINED HEATING SURFACES	2,104·00 ,,
FIREBOX	154·78 ,,	GRATE AREA	27·07 ,,
TOTAL (EVAPORATIVE)	1,841·38 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	27,800 LB.

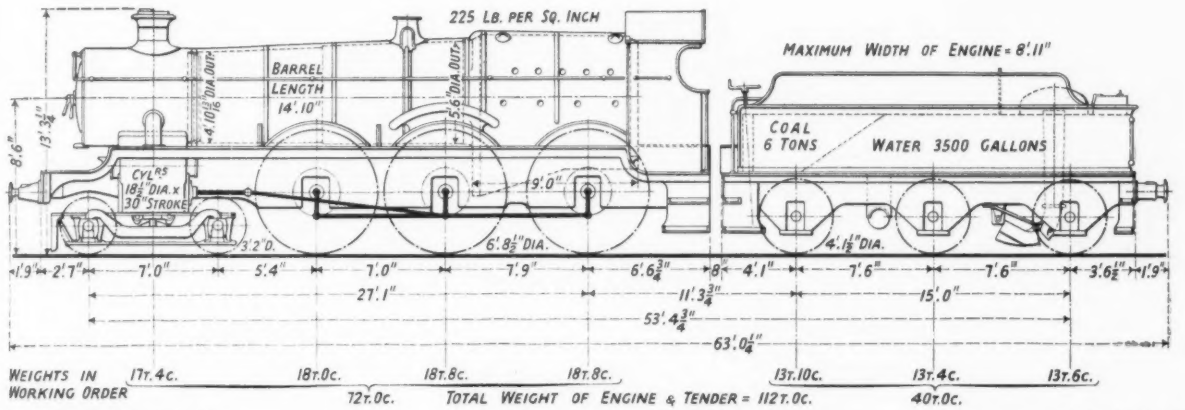
"Star" Class

Great Western Railway


225 LB. PER SQ. INCH
MAXIMUM WIDTH OF ENGINE = 8'.11¼"
BARREL LENGTH 14'.10"
COAL 6 TONS
WATER 4000 GALLONS
CYLS 18½" DIA. x 30" STROKE
WEIGHTS IN WORKING ORDER
18T.10c. 18T.12c. 18T.19c. 18T.19c. 15T.12c. 15T.11c. 15T.11c.
75T.0c.
TOTAL WEIGHT OF ENGINE & TENDER = 121T.14c.
46T.14c.

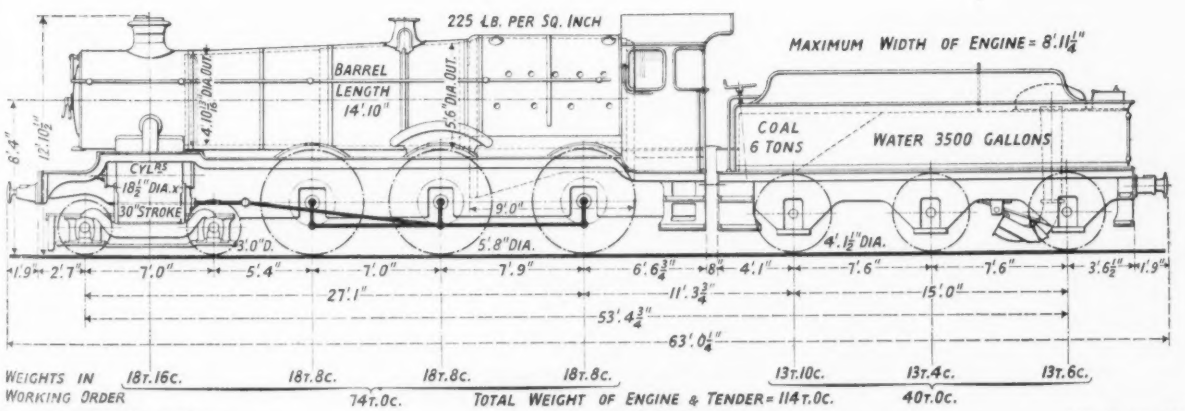
HEATING SURFACE, TUBES—		SUPERHEATER	262·62 SQ. FT.
LARGE AND SMALL	1,686·60 SQ. FT.	COMBINED HEATING SURFACES	2,104·00 ,,
FIREBOX	154·78 ,,	GRATE AREA	27·07 ,,
TOTAL (EVAPORATIVE)	1,841·38 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	27,275 LB.

"Hall" Class


225 LB. PER SQ. INCH
MAXIMUM WIDTH OF ENGINE = 8'.11"
BARREL LENGTH 14'.10"
COAL 6 TONS
WATER 3500 GALLONS
CYLS 18½" DIA. x 30" STROKE
WEIGHTS IN WORKING ORDER
17T.4c. 18T.0c. 18T.8c. 18T.8c. 13T.10c. 13T.4c. 13T.6c.
72T.0c.
TOTAL WEIGHT OF ENGINE & TENDER = 112T.0c.
40T.0c.

HEATING SURFACE, TUBES—		SUPERHEATER	262·62 SQ. FT.
LARGE AND SMALL	1,686·60 SQ. FT.	COMBINED HEATING SURFACES	2,104·00 ,,
FIREBOX	154·78 ,,	GRATE AREA	27·07 ,,
TOTAL (EVAPORATIVE)	1,841·38 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	24,395 LB.

"Saint" Class


225 LB. PER SQ. INCH
MAXIMUM WIDTH OF ENGINE = 8'.11¼"
BARREL LENGTH 14'.10"
COAL 6 TONS
WATER 3500 GALLONS
CYLS 18½" DIA. x 30" STROKE
WEIGHTS IN WORKING ORDER
18T.16c. 18T.8c. 18T.8c. 18T.8c. 13T.10c. 13T.4c. 13T.6c.
74T.0c.
TOTAL WEIGHT OF ENGINE & TENDER = 114T.0c.
40T.0c.

HEATING SURFACE, TUBES—		SUPERHEATER	262·62 SQ. FT.
LARGE AND SMALL	1,686·60 SQ. FT.	COMBINED HEATING SURFACES	2,104·00 ,,
FIREBOX	154·78 ,,	GRATE AREA	27·07 ,,
TOTAL (EVAPORATIVE)	1,841·38 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	28,875 LB.

"Grange" Class

FACING POINTS

With special reference to their locking and other safety devices

THERE is little doubt that one reason for the success of the conventional railway, if we may so term the principle of two lines of rail with wheels flanged on the gauge side, is the ease with which it is possible to pass vehicles from one track to another. The absence of such a facility would have seriously restricted the usefulness of railways, as has been demonstrated by certain other forms of construction, such as Lartigue's monorail, used at one time in Ireland between Listowel and Ballybunion, or Langen's suspended monorail, to be seen between Barmen and Elberfeld in Germany. On the Ballybunion railway it was necessary to have a sort of turntable in place of points, and the construction of a junction on the Barmen line, as illustrated in our issue of October 18, 1935, page 628, is quite an elaborate affair. Even with standard permanent way, the construction of points calls for some care and thought, and although at first switches formed by sliding rails were used to some extent, the pivoted tongue method, from which the term " points " arose, has superseded all others by the very simplicity of its principles. The adoption of points, and their necessary counterpart, crossings, introduced dangers peculiar to themselves which rightly caused them to be regarded with some apprehension, and for a long time speed over them, especially in the facing direction, was necessarily kept low. As the number of stations and junctions increased, this prevented railways being used to the best advantage, and a tendency arose to ignore the speed regulations, whereby several accidents resulted.

The concentration of point and signal working in lever frames actually increased some of the dangers at first, by introducing the possibility of failed connections, of points not being properly closed, or of their being moved in front of or under a train. It was not long therefore, before engineers proposed various means for locking facing points securely and later of meeting the other requirements, such as detection and the holding of points while vehicles were passing. How large was the number of devices proposed was shown by the interesting lantern lecture, " A Chronological Record of the Protection of Facing Points," delivered before the Institution of Railway Signal Engineers on December 16 by Mr. R. S. Griffiths, Past President. Mr. Griffiths dealt with the important subject of the development of the locking frame in his Presidential Address on February 14, 1934, and the present lecture continued the work. Many of the facing point mechanisms he described involved only small variations of the same fundamental idea, and had the patent search been what it is now, there is no doubt that several would not have achieved the dignity of being patented. Some were ingenious enough, but were too involved and comprised too delicate parts to stand up to the hard conditions met with in all weathers on the permanent way; gradually, as the various patents lost their value, the simple plunger bolt construction, originated by Saxby, prevailed in this country, to the exclusion of wedges and other devices, generally with independent lever working. The former Midland Railway was peculiar in standardising, with Prince and Langley's apparatus, economical, or switch-and-lock, working, to which its own excellent pattern of locking frame was particularly well suited. In power signalling, of course, this principle has again found a general field.

Even after the introduction of point locks and locking bars, some engineers would instal facing points only where they were absolutely unavoidable. That eminent engineer of the North Eastern Railway, T. E. Harrison, himself the designer of a very good wedge facing point lock long in use, actually said in 1874, before a meeting of the Institution of Civil Engineers, of which he was President: " I have so great a horror of facing points, knowing the accidents occurring at them, that on the line between York and Berwick, for many years, except at the stations at Darlington and Newcastle, there were only three facing points in a distance of 160 miles; but the increase of traffic has of late necessitated the introduction of a few more." Many others held views almost as strong. There was ground for their doing so, when the number of accidents at points in early years is considered. From 1871 to 1880 211 were inquired into, but the number fell to 65 in the next decade and continued to fall steadily, being only 5 from 1901 to 1908, and in spite of increased traffic and the much faster working obtaining at many stations today, so efficient are the appliances at our disposal that, although facing points are a possible source of danger, there is no ground for viewing them with any particular anxiety. Some engineers still, however, prefer to see as few of them as possible, but more on account of the cost of the apparatus now often required, the maintenance and care it necessitates, and the delays which irregularities cause, than from fear of accidents.

In countries using non-trailable points practice has developed broadly on similar lines to those followed here, but in those where the trailability of all points has long been a standard requirement a different line of thought has necessarily been pursued. Point tongues are then no longer rigidly connected, but must move independently and be locked in turn, a circumstance which has produced the various toggle, hook, or claw locks found in many countries, with the corresponding detecting and controlling devices, some of which are very interesting and are even now undergoing modification to suit the longer switches required for faster running. In America spring returned switches are being increasingly used, especially on single line sections under centralised traffic control, and automatic facing point locking has been applied to them as it has, in another form, on the Mumbles line in South Wales. The subject has been so much studied by now that it is unlikely that any great changes will be seen in future, the devices in use both at home, and in America, as well as on the Continent, representing the survival of the fittest in their respective spheres of thought and providing a very high degree of security, especially when supplemented by electric route locking, now becoming increasingly common in various forms.

A SCOTTISH BUS ACQUISITION.—The Scottish Motor Traction Co. Ltd. has taken over the Coast Line bus service of the Musselburgh & District Electric Light & Traction Co. Ltd. That company was incorporated on July 5, 1905, and for many years operated an electric tramway system. At the end of 1927 the company abandoned 3½ miles of tramway in the Prestonpans and Port Seton area, and sold the remainder of its tramway to the Edinburgh Corporation on May 7, 1931. Motorbus operation was inaugurated on February 25, 1928, and a frequent service is maintained between Edinburgh and Port Seton with about two dozen vehicles operating under the fleet name " Coast Line."

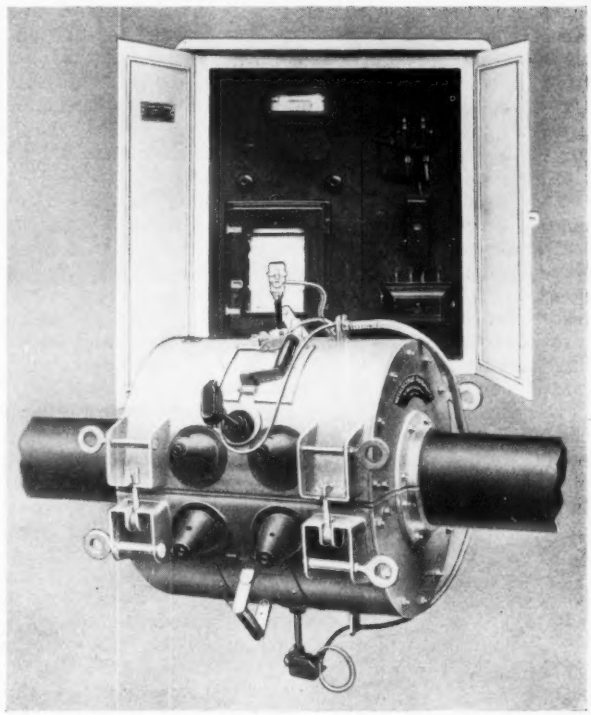
METALECTRIC FURNACE FOR NORMALISING WELDED JOINTS IN PIPES

Portable equipment for heat-treating welded pipe joints already in position

THE normalising of welded pipe joints has always presented considerable difficulty, especially in cases where the pipes have been fitted and welded into their ultimate positions. Metalectric Furnaces Limited, of Smethwick, Birmingham, has, however, overcome this difficulty by producing a portable type electrically heated joint annealing furnace. The furnace, of which an illustration is appended, is unique in that it is specially designed to heat-treat the joints of pipes already in position, and is constructed for easy transportation from one location to another. It is cylindrical in shape, made in halves, and fitted with suitable locking arrangements, so that the halves of the furnace can be clamped around the joints to be heat treated. Handles are provided for lifting purposes, and loose distance rings are arranged to suit the diameter of the pipe under treatment, so that various sized pipes can be dealt with. The rings are split to ensure the furnace being concentric to the outside diameter of any sized pipe in a given range.

The furnace is heavily insulated, and to conform with the split rings insulating refractories of varying diameter can be used to prevent the entry of cold air and consequent increase in heat losses. The working temperature of the furnace is 600/650° C., and the control of this is effected by instruments housed in a special type portable steel plate case provided with lifting lugs. The heating elements are made of heavily sectioned nickel chrome strip. In order to attain accurate control, a series of holes is arranged, through which search couples can be linked to a recorder, so that the actual temperature of the pipe under treatment is recorded throughout the whole treatment period.

Special care in the design and construction of this furnace ensures that it will withstand the rough handling to which it will be subjected in transportation from site to site, and, in view of the delicacy of their construction, special care has been taken with the arrangement and fitting of the controller and recording instruments. The furnace was designed, built and actually in use within a few weeks of the proposal being put forward, and Metalectric Furnaces Limited is to be congratulated on the achievement. The design of the furnace opens up a new phase in electric furnace heat treatment work, and the maker has under consideration the design of other portable furnaces for application to a wide range of industries.



The Metalectric portable furnace

Feedwater Heating and Thermal Efficiency

Remarking that many of the railways in America had speeded up their train schedules with standard types of locomotives, and that this led to a substantial sacrifice of fuel economy, Mr. R. M. Ostermann, at a discussion which took place at the regular monthly meeting of the Western Railway Club, Chicago, made some interesting remarks relative to the effect of speed on fuel consumption. He pointed out that when a locomotive hauls a train of a given weight over a specified distance in 2 hr. 45 min., whereas another engine takes 3 hr. for the same run, the first mentioned locomotive does about 10 per cent. more work per hour than the second one, delivering about 10 per cent. more horsepower. If the fuel consumption rate per drawbar horsepower-hour remained unchanged with this increase of horsepower, the fuel consumption rate per locomotive-mile would be unchanged, and fuel performance statistics on the locomotive-mile basis would then quite satisfactorily portray the relative state of maintenance of the two engines. The fuel consumption rate per drawbar horsepower-hour does not, however, remain constant with a 10 per cent. increase in horsepower; it increases perceptibly, and very much so if the slower haul is made by an underboilered locomotive. This means that more coal per locomotive-mile is consumed on the fast than on the slower haul, and this is not because the mechanical condition of the faster locomotive is poor but because of the rate at which it is worked. Feedwater heating was characterised by the speaker as a relatively inexpensive means of adding to the evaporating capacity of a locomotive boiler, thereby improving thermal conditions and enhancing the capacity of the engine to perform its work efficiently.

ROUTE SIGNALLING FOR LONDON TRANSPORT—I

The Rayners Lane installation

UNTIL recently the power signalling installations on the lines owned by the London Passenger Transport Board have always been constructed on the individual lever principle, but a method of route lever working having been devised and applied successfully at West Kensington, the latter principle was selected for the new signal cabin at Rayners Lane, the junction of the lines from Harrow-on-the-Hill and South Harrow with that from Uxbridge. Similar apparatus has since been adopted for a further cabin near Earls Court, which controls the working of the lines from Kensington High Street and on the Cromwell curve.

The Piccadilly Line train service was extended from South Harrow to Rayners Lane and Uxbridge in October, 1933. In November, 1934, the old Rayners Lane cabin was damaged by some runaway wagons, and it was decided to proceed with plans, developed some time before, for improving the facilities at that place, providing a reversing siding for trains terminating there, and installing power signalling. The complete scheme was brought into use on November 17, 1935.

The original Rayners Lane box had a 22-lever mechanical frame and stood between the Harrow-on-the-Hill and South Harrow lines. The new one is at the west end of the up platform and controls the whole of the layout previously worked, together with the additional reversing siding which has been installed between the up and down roads. At the same time it has been possible to dispense with a cabin between South Harrow and Rayners Lane, with a 14-lever mechanical frame for working the junction to the Harrow Gas Light and Coke Company's sidings, which was switched in as required. To do this necessitated a long and somewhat dangerous walk along the track for about three-quarters of a mile from Rayners Lane, and the services of a part time signalman.

Route Lever Working

A 35-lever power locking frame now operates the whole of this layout on the route signalling principle. The levers are of the push-pull type. When pushed they set up the route and clear the signals for one direction; when pulled they set up an alternative route. The signal identifications are made up of a prefix letter, P, followed by the signal lever number, and H if operated when the lever is pushed, or L if operated when it is pulled. A final A, B, or C letter denotes consecutive signals on the same route. The signalman can restore a route lever to normal and operate one for any other route as soon as the train has replaced the last signal on a route to danger, and before it has cleared the fouling point. The new route will then be set up automatically as soon as it does so. This ensures maximum speed of operation with the minimum number of lever movements.

A special type of point control relay has been developed

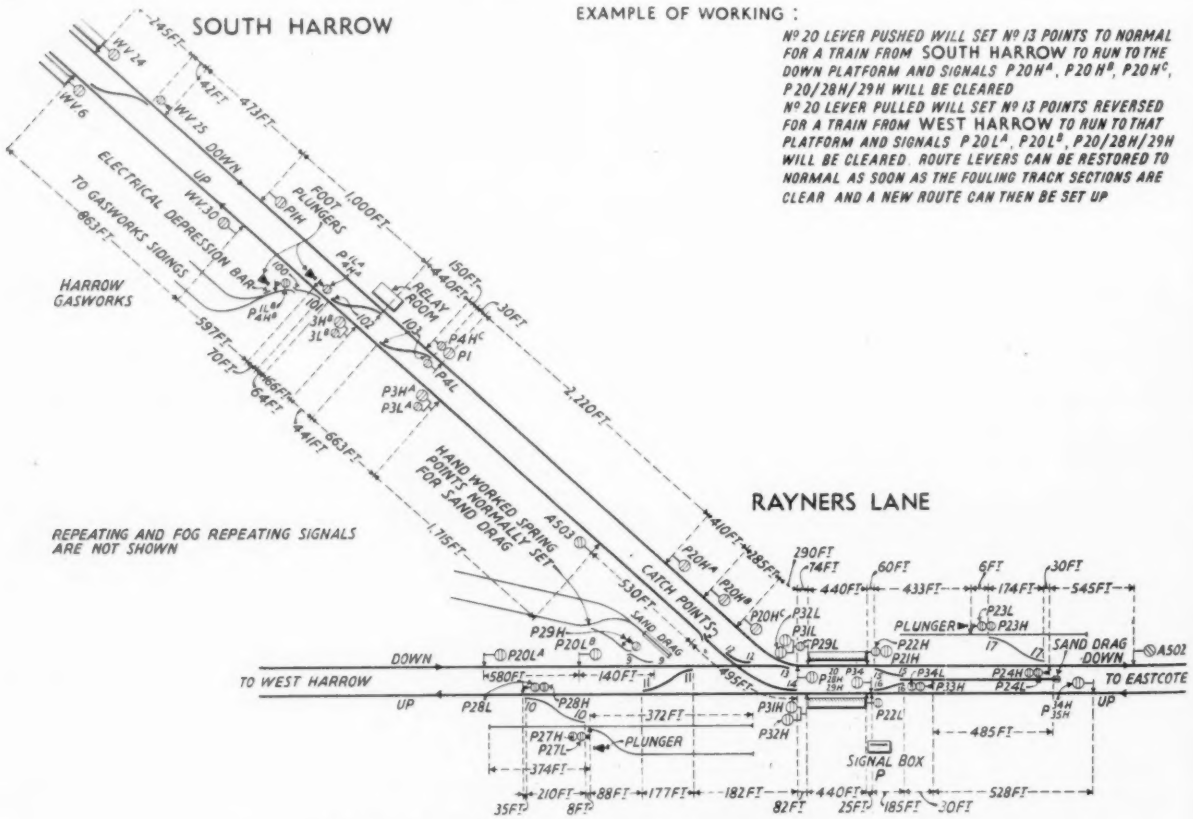


Diagram of track layout at Rayners Lane, London Passenger Transport Board

for the work, consisting of a gravity biased vane which, when energised in one direction, throws the vane over to one side, where it will remain if the relay is de-energised and will be thrown over to the other direction only when the current is reversed. This relay can be energised only when all track circuit sections on the proposed route are clear.

Relay Accommodation

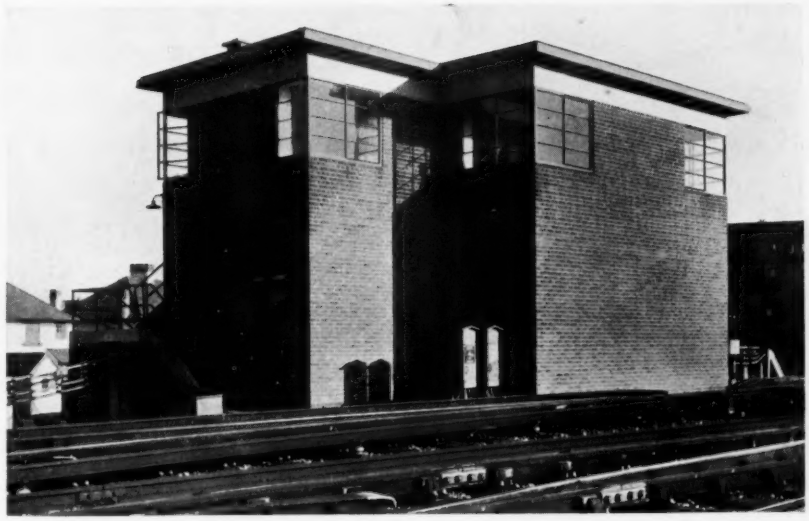
The relays are assembled either in the relay room in the basement of the new cabin at Rayners Lane or in one adjacent to the junction at Gas Works sidings. They are accommodated on metal racks in the centre of the rooms and are provided with detachable tops. The cables are brought in through the walls to fuses arranged on metal supports. A number of small relays, similar to the telephone type, are used in some of the circuits, and in order to minimise the risk of faulty contacts due to dust, arrangements have been made for eight of these to be incorporated in one standard relay case, forming what are known as Octa relays.

Sturge patent winders are provided for the neat storage of inspection lamp leads. The Underground standard method of providing an opening under the locking frame, with a platform underneath, has also been adopted.

Locking Frame and Diagram

A red visual indication is provided over the route levers to show when the whole of the signals controlled by that lever are at danger. Individual point levers are provided for emergency operation, and are locked when the route levers are in use. They have the usual N and R indicators.

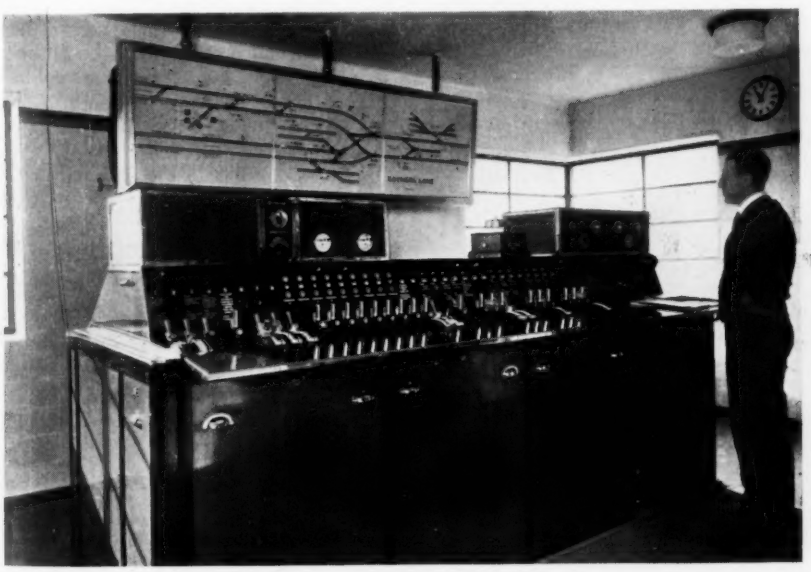
The frame is enclosed in a metal casing. An extension at the right hand end acts as a booking desk and incorporates the telephone keys. The casing is also carried above the normal level of the instrument shelf at the ends to accommodate various auxiliary apparatus, such as air pressure gauge, voltmeter, signal mains indicators, fog repeater switch, train describing bells, &c.



Exterior of new signal box at Rayners Lane

The illuminated diagram is of the continuous strip type, in aluminium framing. When the track circuits are unoccupied, a continuously illuminated strip indicates the direction in which the points are lying, the strip representing the other direction being dark, a feature first adopted in the previous route signalling scheme at West Kensington.

The working at Gas Works sidings is rather special. The interlocking is effected in the relay room, connected to Rayners Lane by eight wires only. A foot worked plunger is provided, which can be depressed by the engine driver without leaving his cab, operating an indicator at Rayners Lane to notify the signalman that the engine is ready to leave.



Interior of new signal box, Rayners Lane

The signalling is fed at 600 volts a.c. from alternative supplies for either road, taken into 600-volt chambers adjacent to the relay rooms. Two transformers are provided for transforming this down to 100 volts for the signal and point circuits. All running signals are of the daylight colour type and provided with electro-pneumatic trainstops. Fog repeater signals are also provided. The point mechanisms are also of the electro-pneumatic type. The whole of this apparatus, together with track circuit equipment, and locking frame, was manufactured by the Westinghouse Brake & Signal Co. Ltd., and installed by the L.P.T.B., whose Signal Engineer, Mr. W. S. Every, prepared the plans and has provided us with the above particulars. The lock-and-block formerly used between Rayners Lane and South Harrow has been abolished and there is now no such apparatus on any line wholly owned by the London Passenger Transport Board.

TROWEL PACKING OF PERMANENT WAY

A system of modified shovel packing has been devised and is now in successful operation on the Great Southern Railways of Ireland

BY the courtesy of Mr. Gerald J. Murphy, Chief Engineer of the Great Southern Railways, we are enabled to publish a description of the methods of shovel packing the permanent way which have been in practice on that system since 1925. The packing tool which was found by experiment to be most satisfactory and is still generally in use on the Great Southern is a small trowel, at the top of the accompanying photograph. The type of box used for carrying the screenings is shown in one of our illustrations, as well as the type of jack used for lifting the track, and the method of inserting the screenings under the sleepers is the usual one in vogue where shovel or fly packing is practised. Although it is found that track jacks are the most satisfactory means of lifting, they are expensive and are mostly confined to yard gangs. On open line a claw bar with a gun barrel extension acting on a suitable fulcrum, such as a chair with a broken jaw, is the instrument generally used. Screen chippings are stored in depôts at each ¼ mile along the line.

The work to be done is marked out by the ganger, and one man removes the ballast from between alternate sleepers for a distance of about 18 in. inside the rail to the ends of the sleepers, and to the level or slightly below the level of the sleeper bed. When the rail has been lifted, the ganger, having already judged of the amount of packing required, scatters the screenings under the rail in three places: inside, directly under, and outside the rail. To do this properly he must pass the trowel, on which the screenings have been evenly spread, under the sleeper and at right angles to it and must not shake it until it has gone right across the bed. Not more than four sleepers (two at each side of the lifting tool) can be done satisfactorily at one lift. When packed, the track is allowed to fall back smartly, and, with experience, the gangers are able to leave a good top that requires no settling by trains except in places where there is a soft foundation.

This method has been found to give excellent results, and the top was generally improved so much that in 1927 it was found possible to extend the gang lengths from a standard of 4¼ miles to 4½ miles of single track, with a net saving to the company of about £28,000 a year. A further advantage was that the bottom edges of the sleepers were no longer eaten away by careless beater packing.

Long-Trowel Packing

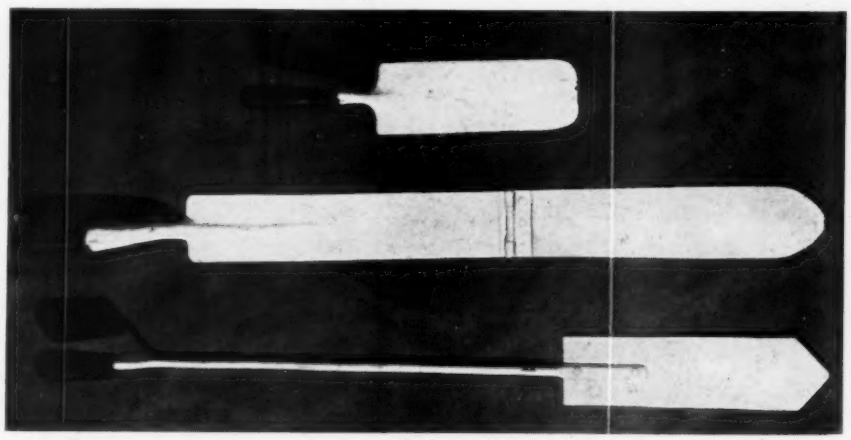
Since 1934 an alternative method of packing the sleepers from their ends has been devised by Mr. T. R. Leonard, District Engineer, Waterford, and has proved a marked success. For this method a hinged trowel (the middle one in the photograph) is used which is narrow enough to pass between the fang bolts. Its light weight makes it handy in use, and the hinge enables it to be used in the 6-ft. way and where the line is in a narrow cutting. The tools when made by a local smith cost 2s. 6d. each, and the unhinged trowel with the long handle (bottom in the photograph), which is equally serviceable for single lines, costs only 1s. 6d. The original trowel for side packing costs 1s. 0d.

When using the hinged trowel the ballast is, of course, scraped from the ends of the sleepers only. The track is lifted as before, and the trowel, upon the tip section of which only the screenings are spread, is pushed under the sleeper as far as it will go and on a slight diagonal so as to pass easily between the fang bolts. The screenings are shaken off, a slight tap against the inner fang bolt assisting distribution. A second trowel full is shaken under the chair and a third outside it. The amount of screenings used depends, of course, on the amount of the lift required, and gangers very soon learn to equate them.

In the experimental stage tests were made to ascertain that the hinged trowel would distribute the screenings as satisfactorily as the cross trowel, particularly inside the rail and behind the inner fang bolt. After the packing had been done the sleepers were removed, and as the accompanying photographs show, the distribution of the screenings was found to be good. Whitewashed chippings were used in these tests so that the photographs would illustrate the results.

To pack from the 6-ft. way or in narrow cuttings, the ballast is opened and the track lifted as before, but when the tip of the trowel has been loaded it is held horizontally in the left hand and the handle is held vertically with the right until the top is passed in under the sleeper, when this hand is gradually lowered. With practice packing from the 6-ft. way is very nearly as quick as from the brow. Although the hinged trowel cannot be used along platforms it can be doubled and used as a cross trowel in such places.

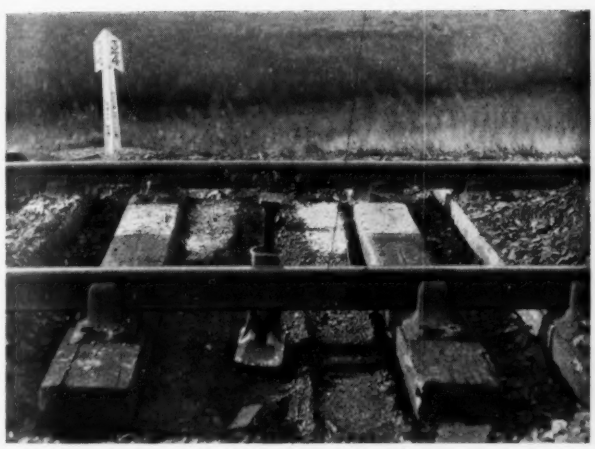
It has been found that a use of the long trowel has resulted in improved maintenance, and that the inspectors and gangers generally say that the track requires



Trowels for packing sleepers. Top : small trowel ; middle : hinged trowel ; bottom : long-handled trowel

End packing of cess rail. Extra moved to avoid shading in photograph. Note convenience of chipping barrow

End packing of six-foot rail. Note use of hinge to minimise moving ballast. Lift of sleeper 1½ in.



Beds after end-packing with long trowel. Sleepers moved for photographing. Left : rail still jacked up ; right : 2-ft. rule shows extent of packing inside rail

Men carrying tools and supply of chippings sufficient for normal repairs between depots

Standard method of trowel packing on G.S.R. Note 1½-in. lift of sleeper to permit proper insertion of loaded trowel

TROWEL PACKING OF PERMANENT WAY, GREAT SOUTHERN RAILWAYS OF IRELAND

less attention both as regards packing and pulling. Although at first there were a few gangers who did not like this method of packing, the great majority are wholeheartedly in favour of it. It is found, too, that some improvement in the drainage of sleeper beds results from this method of packing, as indeed might be expected by the periodical moving of the ballast shoulder.

To ascertain comparative output of work with the short cross trowel and the long hinged trowel, a series of tests was made. Several gangers on one division were required to repair two successive or parallel half miles of track, one by one method, the other by the other. The number of sleeper ends packed was counted as well as the number of man-hours required for the work, including opening out and closing in the ballast. Secondly, a larger number of gangers on several divisions representing all classes and conditions of track were required to do a day's work with each method, and the number of sleeper ends was divided by the number of man-hours employed for the whole process. After discarding all doubtful results, particularly any appearing to be unduly favourable, it was found that a three-man gang would open out, pack and close in 172 sleeper ends a day with the short trowel, and 307 with the long trowel. These figures are borne out by most gangers who say they can do twice as much in a day, and by the few who say half as much again.

To secure a financial saving equal to this saving of labour is not possible, as it is neither practicable to reduce the number of men in the gangs nor to increase their lengths. Nevertheless savings accrue by enabling gangs to deal with more extra work, such as fencing, drain cleaning, road making, &c., without help, and to suffer loss of time through illness or other causes without having to have the time made up.

NEW TANK LOCOMOTIVES FOR SERVICE IN GERMANY

Built by the Borsig Locomotive Works of Berlin-Hennigsdorf for private German railways and industrial concerns

DURING a recent visit to the Borsig Locomotive Works at Hennigsdorf, near Berlin, we were enabled to inspect locomotives of various types then in course of construction. Some of these were for the Deutsche Reichsbahn, and others for private railways and industrial concerns in Germany. Those illustrated belong to the latter categories and comprise 2-10-2, 2-6-2, and 0-8-0 type side tank engines, and a fireless steam locomotive.

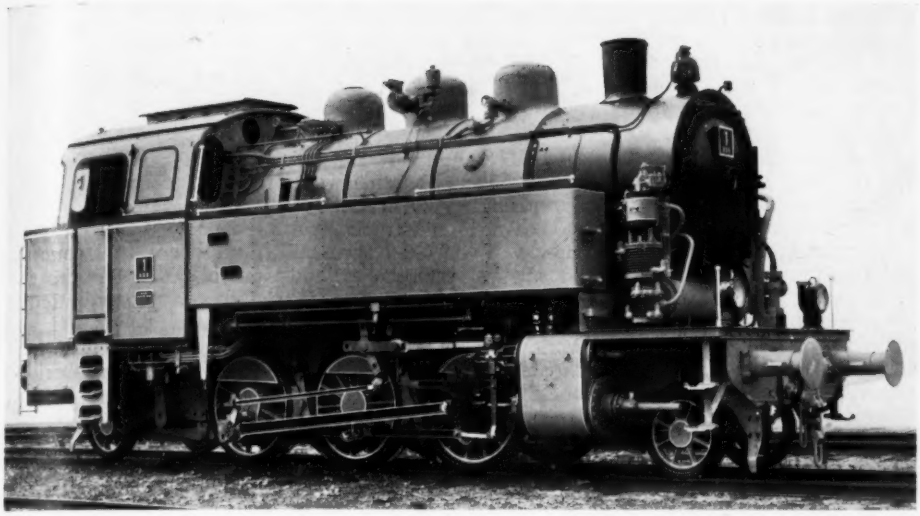
The 2-10-2 type superheated locomotive shown in the first of the accompanying illustrations is the heaviest tank engine yet built in Germany. Its weight in working order is nearly 140 tons, with the unusually high maximum axle loading of 23 metric tons (22 tons 12 cwt.). A maximum of about 2,500 metric horsepower (2,468 h.p.) is developed, and the maximum speed for which the locomotive is designed is 50 km.p.h. (31 m.p.h.). The engine was built by the Borsig Company for the Preussische Bergwerks und Hütten A.G., Hindenburg, Upper Silesia, and it recently ran its works and acceptance trials in the presence of numerous representatives of the Deutsche Reichsbahn, of German light and private railways, engineering colleges, and industrial concerns.

The principal particulars are as follow:—

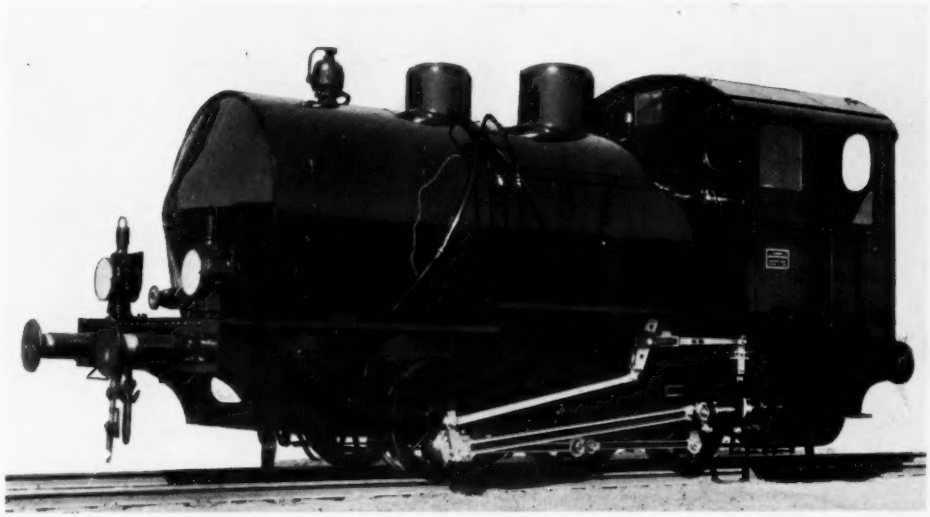
Cylinders, dia.	700 mm. (27½ in.).
Piston stroke	660 mm. (26 in.).
Coupled wheels, dia.	1,300 mm. (4 ft. 3 in.).
Boiler working pressure	16 at. (227 lb. per sq. in.).
,, heating surface	247 sq. m. (2,657·7 sq. ft.).
,, ,, ,, superheater	94 sq. m. (1,011·4 sq. ft.).
Combined total	341 sq. m. (3,669·1 sq. ft.).
Grate area	5·38 sq. m. (57·9 sq. ft.).
Weight of engine in working order	138·4 metric tons (136 tons 4 cwt.).
Adhesion weight	115 metric tons (113 tons 4 cwt.).
Water capacity	17 cu. m. (3,740 gallons).
Fuel capacity	4·5 metric tons (4 tons 8 cwt.).
Maximum tractive effort	30,000 kg. (66,150 lb.).

The locomotive is capable of hauling a load of 1,500 metric tons (1,476 tons) up a gradient of 1 in 100 at 30 km. (18½ m.) p.h. Its duty is that of sand transport

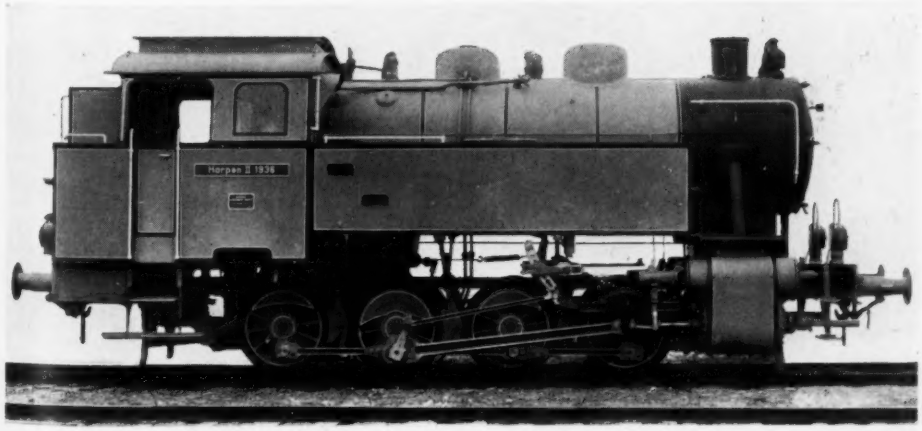
New 2-10-2 type superheated tank locomotive for service in Upper Silesia



Left : 2-6-2 superheated steam tank locomotive for a German private railway. This engine is fitted with a surface type feedwater heater located below the smoke-box



Right : 0-6-0 fireless steam locomotive for industrial purposes



Left : 0-8-0 tank locomotive for industrial purposes

NEW TANK LOCOMOTIVES BUILT BY THE BORSIG WORKS FOR SERVICE IN GERMANY

in the Upper Silesian coalfield. In this district, the geological and structural nature of the country abounds in rocky formations, making it necessary to pack the cavities caused by mining. The sand used for this purpose is excavated from pits, distant twelve miles or more from the coal mines, and is hauled along special railways in trains weighing up to 1,700 metric tons (1,673 long tons) to silos immediately adjoining the pit shafts. There the self-emptying wagons run on to a dumping bridge and discharge their contents into the silos, whence the sand is carried hydraulically into the mine through pipe lines. The water used for this hydraulic stowing is pumped back to the surface after it has served its purpose, and is used again after being clarified.

In the solution of the many special problems of design and construction encountered in the building of a locomotive for this service, the Borsig Locomotive Works have the advantage of extensive experience in the construction of similar engines. Indeed, the one illustrated may be regarded as the outcome of nearly sixteen years of development, beginning with the building of a similar locomotive for the Halberstadt-Blankenburg Railway in 1920. This company has in service several tank engines of large proportions and varying wheel arrangements, including some powerful 2-8-2 and 2-10-2 types engaged in passenger and freight service on the 4 ft. 8½ in. gauge. The new Borsig locomotive is, however, much larger and more powerful than any of these.

The 2-6-2 type tank engine, illustrated on page 201, and others of the same class, were built for a private railway, the gauge of which is standard (4 ft. 8½ in.). As seen, this locomotive is equipped in accordance with main line practice, and it will be noticed that the reservoir of the Knorr brake system is located below the smokebox. The boiler is equipped with superheating apparatus, and it will be noted from the particulars given below that the steam pressure is exceptionally high for an engine of this type. The main particulars are as follow:—

Cylinders, dia.	450 mm. (17¾ in.).
,, stroke	550 mm. (21⅝ in.).
Coupled wheels, dia.	1,300 mm. (4 ft. 3¼ in.).
Boiler working pressure	16 at. (227 lb. per sq. in.).
,, heating surface, total ..	147 sq. m. (1,581·7 sq. ft.).
Grate area	2 sq. m. (21·5 sq. ft.).
Weight of engine in working order	64 metric tons (63 tons).

This engine is built for a maximum speed of 80 km., approximately 50 m.p.h.

The next illustration shows a fireless steam locomotive of the 0-6-0 type built for an industrial concern. As will be seen, the cylinders are placed below the cab and drive the front pair of wheels; steam distribution is by Heusinger valve gearing. In this design the maximum working pressure is 15 at. (213 lb. per sq. in.). The tank capacity amounts to 15 cu. m. (529·6 cu. ft.). In working order the engine weighs 40 metric tons (39 tons 7 cwt.). The cylinders measure 23⅝ in. dia. by 19⅝ in. stroke, and the wheels 3 ft. 3½ in. dia.

The concluding illustration shows a 0-8-0 type tank engine constructed for an important industrial concern. In this case the service is of a difficult nature, involving the negotiation of curves of small radius and some rather stiff climbing. This engine is not superheated. The main particulars are as follow:—

Cylinders, dia.	530 mm. (20⅞ in.).
,, stroke	550 mm. (21⅝ in.).
Coupled wheels, dia.	1,100 mm. (3 ft. 7¼ in.).
Boiler working pressure	16 at. (227 lb. per sq. in.).
,, heating surface	123 sq. m. (1,323·5 sq. ft.).
Grate area	2·04 sq. m. (22 sq. ft.).
Weight of engine in working order	60 metric tons (59 tons 1 cwt.).
Maximum speed	50 km. (31 m.) p. h.

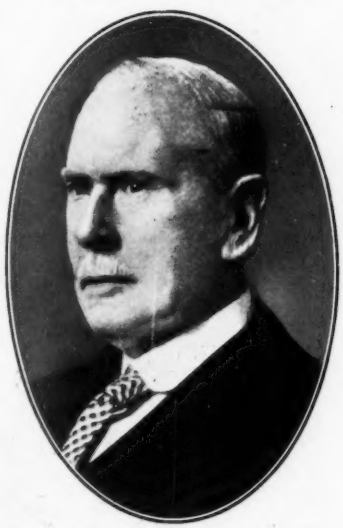
In addition to the locomotives illustrated we saw others of interesting types at Hennigsdorf, some of which we shall hope to illustrate and briefly describe in a later issue.

The Fontpédrouse (or Séjourné) viaduct on the Midi Railway system, in the Eastern Pyrénées

RAILWAY NEWS SECTION

PERSONAL

Mr. Braman B. Adams, Senior Associate Editor of our American contemporary the *Railway Age*, and a member of its editorial staff and of one of its predecessors, the *Railroad Gazette*, since January 1, 1887, retired from that position on December 31 last. He had thus completed a remarkable career of 50 years in railway journalism following 21 years of railway service, and is a recognised authority on signalling; he also served as an Associate Editor of *Railway Signalling*. Mr. Adams was born in 1851 and was educated at Monson Academy. He joined the Western Railroad (now part of the Boston & Albany system) in

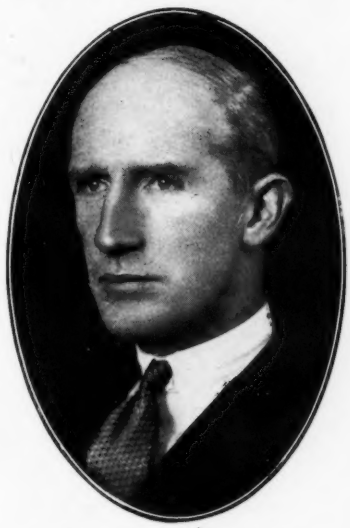


Mr. Braman B. Adams,

Senior Associate Editor of the *Railway Age* who retired on December 31

1865, and, after 21 years successively as clerk, telegrapher, yardmaster, and station agent on those lines, became Associate Editor of the *Railroad Gazette*, on January 1, 1887. He was the author of "The Block System" and of articles in the "Encyclopedia Britannica," and, in 1906, was retained by the Interstate Commerce Commission as an expert to study block signal systems, and appliances for automatic control; later he became a member of the Block Signal and Train Control Board, proceeding, as a member of it, to study European signalling practices. In 1903-4 he was Secretary of the Railway Signal Association. A keen student of railway accidents and their causes, Mr. Adams was influential in the setting up of adequate methods for accident investigation and reporting in the United States. We wish Mr. Adams health and happiness in his well-earned retirement.

Mr. J. C. L. Train, M.C., who, as announced in our issue of January 22, has been appointed to succeed Mr. Inglis as Assistant Engineer, Southern Area, L.N.E.R., entered the Engineer's office of the North British Railway in Edinburgh as a pupil in 1908. He



Mr. J. C. L. Train, M.C.,

Appointed Assistant Engineer, Southern Area, L.N.E.R.

assisted in the carrying out of various works including widenings at Portobello (under Mr. R. J. M. Inglis, Resident Engineer) and Leven, before leaving the office in 1912 to take up a post under his former chief, Mr. C. J. Brown, in the Engineer's office of the Great Northern Railway. Mr. Train was chiefly employed on construction work, and as Assistant Resident Engineer and later Resident Engineer, he had charge of the outside work in connection with the construction of the Kirkstead & Little Steeping light railway, and the Hertford to Stevenage railway. He was employed on the latter work until, in August, 1914, he left the service of the company to enlist in the Royal Fusiliers. Later he was given a commission in a Field Company, R.E., saw service at Ypres, and was wounded in the battle of the Somme in 1916. Mr. Train returned to France towards the end of the war; he was awarded the M.C. in 1918, and was demobilised in June, 1919, with the rank of Major. He returned to the service of the G.N.R., and in 1921 was appointed Personal Assistant to the Chief Engineer. In 1924 he left the Engineer's Department to become Assistant Industrial Agent in the Chief General Manager's office, and in 1925 he was put in charge of the works section of that office as Chief Assistant to Mr. J. A. Wickham. He was appointed Assistant to the Chief General Manager (Works) in 1928 and District Engineer, Western District (Scotland), under Mr. W. A. Fraser, Chief Engineer (Scotland) in 1929. It was in November, 1934, that Mr. Train became Assistant Engineer (Maintenance) Southern Area, L.N.E.R., the position from which he is now promoted to be Assistant Engineer of that area. Mr. Train was for a time Chairman of the London section of the Permanent Way Institution, and has read papers on such subjects as

Mr. H. G. Sayers,

Appointed Assistant Superintendent, Southern Scottish Area, L.N.E.R.

"Railway Electrification," "The Hallade Track Register and Adjustment of Curves," and "Electrical and Mechanical Aids to Maintenance"; also last year he gave a paper before the Institute of Transport in London on "Modern Methods of Permanent Way Maintenance."

Mr. H. G. Sayers, who, as announced in our issue of January 22, has been appointed Assistant Superintendent, Southern Scottish Area, L.N.E.R., joined the former North Eastern Railway at Hull in 1907, and was employed at the Hull West goods sheds, and stationmaster's office, Paragon station, until 1909. He was then transferred to the staff section of the District Superintendent's office at Hull, remaining there until the outbreak of the war. He served with the Royal Engineers in

Mr. W. Y. Sandeman, B.Sc., M.C.,
Appointed Assistant to Engineer (General), Southern Area, L.N.E.R.

Elliott] [& Fry
Mr. T. H. Seaton,
Appointed Assistant to Engineer (New Works), Southern Area, L.N.E.R.

Elliott] [& Fry
Mr. G. B. Barton,
Appointed Assistant to Engineer (Maintenance), Southern Area, L.N.E.R.

Mr. H. E. Stratton,
Appointed Assistant to Engineer (Bridges), Southern Area, L.N.E.R.

Mr. B. P. Fletcher,
Appointed District Engineer, Stratford, L.N.E.R.

Photo] [Vandyk
Mr. A. B. Chester, B.Sc.,
Appointed Divisional Engineer, Central Division, Southern Railway

Egypt and Palestine from 1915 to 1919 and was mentioned in despatches. Upon demobilisation, he returned to the District Superintendent's office at Hull, where he remained until transferred as Chief Staff Clerk in the District Superintendent's office at Sunderland, L.N.E.R., in 1923. In the following year Mr. Sayers moved to headquarters at York, and was employed as head of the staff section in the Superintendent's office from 1927 to 1929, when he was appointed Assistant District Superintendent, Sunderland. After serving as Dock Superintendent, Tyne Dock (1932-33), he was transferred to Eastern Docks, Hull, in a similar capacity, with charge of the Alexandra & King George Docks, and oil-loading jetties at Salt End, the post he vacated on January 18 to take up his new duties as Assistant Superintendent, Southern Scottish Area, with headquarters in Edinburgh.

Mr. W. Y. Sandeman, B.Sc., M.C., who as announced in THE RAILWAY GAZETTE of January 22, has been appointed Assistant to Engineer (General) Southern Area, L.N.E.R., served his apprenticeship with a firm of consulting engineers in Edinburgh, and joined the engineering staff of the North British Railway in 1913 as an assistant in the Maintenance Department, which position he held until 1915. In that year he was appointed an Assistant Engineer to the Port of London Authority, and had charge of constructional work at Victoria Dock. A few months later he received a commission in the Royal Engineers, and served with a field company in France until the end of the war; he was awarded the Military Cross in the New Year Honours of 1918. After demobilisation he returned to the service of the North British Railway as an assistant in the Parliamentary and Constructional Department, and in the autumn of 1925 was appointed Assistant-in-charge of that department. In 1928 Mr. Sandeman was appointed District Engineer, Northern District, Southern Scottish Area, and in January, 1935, was transferred to take charge of the Western District in that area, with headquarters at Glasgow. It

is this position that Mr. Sandeman now vacates to come to London as Assistant to Engineer (General), Southern Area. Mr. Sandeman is a Bachelor of Science in Engineering of Edinburgh University and also an Associate Member of the Institution of Civil Engineers.

Mr. T. H. Seaton, M.Inst.C.E., F.S.I., who, as announced in our issue of January 22, has been appointed Assistant to Engineer (New Works) Southern Area, L.N.E.R., was for a short time at the beginning of his railway career with the Lancashire and Yorkshire Railway, but he subsequently joined the Great Central Railway, where he was engaged on new works and bridge reconstruction. Later, he entered the service of the Great Eastern Railway, and during the war his services were loaned to the War Office, where he took charge of railway design and construction for the Directorate of Movements and Railways. At the end of the war, after a period as Acting District Engineer at Stratford, he went to the Engineer's office at Liverpool Street for supervision of harbour engineering. In 1924 Mr. Seaton took charge temporarily of the Cambridge District, L.N.E.R., and in the same year was appointed District Engineer at Leeds, being transferred to Stratford in a similar capacity in 1928. During his tenure at Stratford, he has been associated with a number of major works, such as the Romford widening, Temple Mills' widening and hump yard, Shenfield widening, and the remodelling of Fenchurch Street station. He has also been responsible for pioneer work in connection with the application of welding to the maintenance of railway structures and permanent way, being, in particular, closely associated with the introduction on the L.N.E.R. of the oxy-acetylene welding of crossings; he has also carried out research work in connection with the stability of soils. Mr. Seaton has given papers on a variety of subjects connected with engineering to technical societies, and is a member of the Research Sub-Committee on Earth Pressures of the Institution of Civil Engineers.

Mr. G. B. Barton, A.M.Inst.C.E., who, as announced in THE RAILWAY GAZETTE of January 22, has been appointed Assistant to Engineer (Maintenance), Southern Area, London & North Eastern Railway, was articled in 1901 to Mr. R. Pawley, then Engineer to the Hull & Barnsley Railway. On the expiration of his articles he joined the engineering staff of that railway and was engaged on general maintenance work and the construction of new railways in South Yorkshire. From 1906 to 1910 he was on the construction of the King George Dock at Hull, then owned jointly by the North Eastern and Hull & Barnsley Railway Companies. In 1910 Mr. Barton was appointed Assistant Resident Engineer on the joint lines then under construction by the Great Central and Hull & Barnsley Railways in the Doncaster District in connection with the new Doncaster collieries. In 1912 Mr. Barton became Resident Engineer for this work with which he was associated until 1917. He was then placed in charge of No. 8 Civilian Railway Company, Royal Engineers, and sent to France on maintenance work. While there he received a Commission in the Royal Engineers and was afterwards engaged on maintenance work in Palestine, eventually becoming Assistant Maintenance Engineer for the whole of the Palestine military railways. Retiring from the Army in June, 1919, with the rank of Captain, Mr. Barton returned to the Hull & Barnsley Railway, and was employed on special and maintenance work until, in 1922, on the amalgamation of the Hull & Barnsley Railway with the North Eastern Railway, he was appointed District Engineer for the Hull & Barnsley section. In July, 1924, Mr. Barton was appointed acting District Engineer at Boston, in charge of the Lincolnshire District, Southern Area, L.N.E.R., and was confirmed in that appointment on January 1, 1925; it is from this position that he is now transferred to London as Assistant to Engineer (Maintenance), Southern Area.

Mr. Henry Ernest Stratton, A.M.Inst.C.E., who, as announced in our issue of January 22, has been appointed Assistant to Engineer (Bridges), Southern Area, L.N.E.R., was educated at the East London College, and began his engineering training under Mr. John Wilson, M.Inst.C.E., M.I.Mech.E., then Chief Engineer of the former Great Eastern Railway in 1899. In 1903 he was appointed Junior Assistant to the New Works Engineer on the construction of the Woodford and Ilford line. In 1904-5 he assisted in the preparation of the plans of, and surveyed the Kelvedon & Tollesbury Light Railway; in the following year he was engaged upon similar work for the Temple Mills to Tottenham widening, and afterwards for the Elsenham & Thaxted light railway also. Mr. Stratton was then appointed Assistant-in-Charge for survey, working drawings, and for carrying out of the construction of the electric power station at Stratford, and in 1907-8 conducted the survey for the Parkeston Quay extension, and supervised the design of the transhipment warehouse. In 1909-10 he obtained data and made calculations, in accordance with the Heavy Motor Cars Acts, for all overbridges on the G.E.R., and, as Principal Assistant to the Bridge Engineer from 1910 to 1916, dealt with all bridge reconstructions, and with the extension of Bishopsgate goods depot warehouse. Mr. Stratton was then with H.M. Forces in France and Belgium and during 1916-17 was on reconnaissance, survey and setting out work, and reporting on bridge capacities in the 4th Army area. He was next on special duty at G.H.Q. in connection with standard bridge designs, and was afterwards construction officer in charge of junction lay-outs, quadrupling and similar works. In 1918 he returned to the G.E.R., and until 1922 was Assistant Bridge Engineer to the Chief Civil Engineer, being promoted to be Bridge Engineer in the latter year. When the amalgamation took place in 1923, Mr. Stratton became Bridge Assistant (Steelwork) to the Engineer, Southern Area, L.N.E.R., the post he now vacates on promotion as Assistant to Engineer (Bridges) in that area. He was elected A.M.Inst.C.E. in 1910, and from that year until 1916 was Lecturer on Structural Engineering and Mathematics at the L.C.C. Westminster Technical Institute.

Mr. B. P. Fletcher, who, as announced in our issue of January 22, has been appointed District Engineer, Stratford, L.N.E.R., received his early training between 1901 and 1906, on the former North Eastern Railway at Newcastle. From 1912 to 1917 he was acting as Assistant District Engineer, but from the latter date was with the Royal Engineers in Macedonia on railway construction works, both standard and narrow gauge. In 1919 Mr. Fletcher was appointed Assistant District Engineer, Newcastle, where he remained until promoted to be District Engineer, Cambridge, in 1927. It is from Cambridge that he has now been transferred to Stratford in a similar capacity. He was awarded the James Forrest Medal and Miller Prize by the Institution of Civil Engineers, of which he is now a full member, for a student's paper entitled "Transition Curves on Railways"; on transfer to associate member he contributed another on "Renewal of Crossing at East End of Newcastle." Whilst at Newcastle, Mr. Fletcher gained experience on the conversion of the Tyneside branches for electric traction, the renewal of bridges, the remodelling of large yards for shipment of coal; and in the layout of munition factories early in the war. As District Engineer, Cambridge, he was responsible for the permanent way in Whitemoor marshalling yards, and for a number of incidental independent schemes; also for the renewal of many timber bridges on various main lines of the L.N.E.R.

Mr. A. B. Chester has been appointed Divisional Engineer, Central Division, Southern Railway, with headquarters at Eastleigh. He received his engineering training at the City and Guilds Central Technical College (1907-11) obtaining the A.C.G.I., D.I.C., and B.Sc.(Eng.)London; he is also an A.M.Inst.C.E. In 1911 he joined the former L.S.W.R., as an assistant, first on new works and then on design in the head office at Waterloo. Three years later Mr. Chester was appointed Resident Engineer on alterations at

Nine Elms, and afterwards as an assistant on the original electrification of the L.S.W.R. He then enlisted as a motor cyclist despatch rider in a Signal Company, Royal Engineers, during the latter half of 1914, and was commissioned in a Field Company, R.E., in the following year; he served in France in the 512th Field Company (56th Division). In 1917 Mr. Chester was transferred to a Railway Construction Company, R.E., and towards the end of hostilities served on the Staff of the Chief Railway Construction Engineer at G.H.Q.; he was demobilised with the rank of Captain. On rejoining the L.S.W.R., he was employed on the staff of the Permanent Way Assistant at Waterloo, and was later appointed Resident Engineer of the reconstruction and reorganisation of the permanent way depot at Redbridge in 1922. This was followed by a period as Resident Engineer on various works in Hampshire including the reconstruction of Southampton Terminus station, and alterations at Bournemouth Central and Southampton West. In 1929 Mr. Chester returned to Waterloo to assist the Chief Engineer in connection with the Charing Cross Bridge scheme, and two years later was appointed Assistant Divisional Engineer, London (East) Division. He remained there until July last, when, on the death of Mr. P. S. J. Bishop, he was sent to Eastleigh as Acting Divisional Engineer of the Central Division, the position in which he has recently been confirmed. Mr. Chester is a Major in the Supplementary Reserve, Royal Engineers (Transportation), and, since 1925, has commanded the 156th Railway (Stores) Company, R.E. (S.R.)

Mr. John P. Allix, who, as announced in THE RAILWAY GAZETTE of January 22, has been appointed District Goods and Passenger Manager, Cambridge, L.N.E.R., was appointed Assistant District Superintendent, Sunderland, on the former North Eastern Railway in 1914. From later in that year, however, and until 1919 he was on war service, and in 1920 became Dock Superintendent, Tyne Dock. From 1923 until the autumn of 1927 he held the position of District Passenger Manager at York, L.N.E.R., but, under the rearrangement of offices in the Leeds District, he became District Passenger Manager there at the latter time. It is from that position that Mr. Allix is now transferred to Cambridge as District Goods and Passenger Manager.

Mr. Thomas A. Hayward, Chairman and Managing Director of Hugh Smith & Co. (Possil) Ltd., whose death we announced in our issue of January 22, was in his 80th year, and was well known in railway engineering circles. His eminence in the machine tool industry was widely recognised, and his ingenuity as a designer and industrial organiser was as alert as ever up to the end of his 60-year association with the engineering industry. Two years ago he formed the company of which he was Chairman and Managing Director, his ability in acquiring contracts speedily restoring activity to the Possilpark establishment. His machine tool inventive faculties produced many remarkable machines that made practicable work not previously considered possible, and not long ago he designed the largest universal plate-bending machine in the world. His death will be mourned by a wide circle of friends in the industry, among his staff and employees, and in church circles, where he was a great worker.

We regret to record the death on December 3 of M. Auguste Piron, Inspector in the Mechanical Engineer's Department and head of Le Mans Apprentices' Training Centre, French State Railways, who was the victim of an attack by an insane pupil at the centre. As a tribute to M. Piron's work at the centre, and to perpetuate the name of one who was held in the greatest esteem and popularity by all who knew him, the school at Le Mans is in future to be known as the Centre d'Apprentissage Auguste Piron. M. Piron began his railway career on February 9, 1901, as an apprentice at Sablé-sur-Sarthe, becoming a cleaner on November 7, 1910. As he progressed in the railway service, he distinguished himself by his mechanical skill and attention to detail, and on the opening of the training school at Le Mans in 1917, he was appointed an instructor. His promotion to an inspectorship in the Mechanical Engineer's Department came on October 1, 1934. His funeral on December 7 was marked by a very large number of tributes, from all grades of staff, to his untiring work in the widest interests of all those who passed through the school of which he rose to be principal.

We regret to learn that Mr. Edwin Thomas Theobald, Assistant to the Traffic Superintendent of the Buenos Ayres Great Southern and B.A. Western Railways, was burned to death in an hotel fire at San Carlos de Bariloche, Lake Nahuel Huapi, Argentina, on December 19. Mr. Theobald and his wife, who perished with him, were trapped in their rooms, when the staircase collapsed in the flames. Mr. Theobald, who was born in London, had been in the service of the B.A.G.S.R. since 1928. Prior to joining that railway he was in the Traffic Department of the Central Uruguay Railway, and previously was for some time with the Leopoldina Railway, Brazil.

We regret to note from *The South Pacific Mail*, the death at Arica, Bolivia, of Mr. T. Clive Shepherd, a well-known railway engineer, and representative of the Peruvian Corporation from 1905 to 1906. He was in charge of the construction of the railway from El Alto to La Paz, and other important South American railway schemes, and was nearly 80 years of age prior to his death.

Ibrahim Eff. Hilal has been appointed Goods Manager of the Egyptian State Railways in place of the late Mr. S. R. Hibbert.

We regret to note the death of M. Eugène Ginot, Secretary General of the Paris Metropolitan Railway. M. Ginot was a Chevalier of the Legion of Honour and for his services in the war was awarded the Croix de Guerre.

The Japanese Ministry of Railways announces the appointment of Mr. Fuwazo Tanaka as Resident Representative in the London office in succession to Mr. Goro Okada, who is returning to Japan to assume new duties at Tokyo headquarters.

From *The London Gazette* of January 15: Regular Army Reserve of Officers; Royal Engineers: Lt. J. Ratter, from Supplementary Reserve of Officers, R.E. Transportation, to be Lieutenant, retaining his present seniority (October 12, 1936).

M. Paul Gruson, Secretary General of the Chemins de fer de l'Est, who recently resigned on reaching the age of retirement, has been appointed Honorary Secretary General. His successor as Secretary General is M. Barth, formerly Ingénieur en Chef attaché à la Direction.

INDIAN RAILWAY STAFF CHANGES

Mr. A. C. Rose, acting Deputy Chief Engineer (Signals), M. & S.M.R., has been appointed to officiate as Deputy Agent, as from October 14, 1936.

Mr. B. L. Harvey has been appointed to officiate as Deputy Chief Engineer, E.B.R., as from November 7, 1936.

Mr. A. R. Gundry, Chief Electrical Engineer, E.I.R., has been permitted to retire from Government service, as from November 15, 1936.

Mr. G. D. Moore, General Traffic Manager, B. B. & C.I.R., has been granted 11 months' leave as from November 30. Mr. W. T. Aldous has been appointed to act in place of Mr. Moore as from that date.

Mr. G. A. Hicks, V.D., Chief Engineer, Burma Railways, has been permitted to retire from Government service, as from December 4, 1936.

Mr. H. P. Renwick, Deputy Transportation Superintendent, Power, G.I.P.R., has been granted 11½ months leave as from December 5, 1936.

Mr. J. Scruby, Deputy Chief Engineer, N.W.R., has been granted leave for 11 months as from December 11.

G.W.R. Appointments

The following appointments were announced on January 28 by the Great Western Railway:—

Mr. F. H. Dashwood, Assistant to the Stores Superintendent, Swindon, to be Principal Assistant.

Mr. H. A. Alexander, Divisional Engineer, Taunton, to be Divisional Engineer at Bristol, upon the retirement of Mr. S. W. Moore, the present Divisional Engineer, on June 16 next.

Mr. E. T. Davies, General Assistant to the Chief Engineer, Paddington, to succeed Mr. Alexander as Divisional Engineer at Taunton on June 16 next.

Mr. D. C. Beaton has been appointed Special Representative, Cruise Department, Canadian Pacific Railway, London, succeeding Mr. Wm. H. Powell resigned. Mr. Beaton, who held commissioned rank overseas during the war, joined the London Passenger Booking Department of the C.P.R. in 1920, transferring to the Cruise Department in 1924, of which department he later became Chief Assistant. Mr. Beaton has acted as Chief Assistant Cruise Director and Chief Cruise Director for many years on the company's New York—Mediterranean cruising service.

Mr. G. E. Titren, Chief Superintendent of Motive Power, South African Railways and Harbours, who, as announced in our issue of January 22, has proceeded on leave preparatory to retirement, joined the Natal Government Railways as an apprentice in the Locomotive Department at Durban, in 1893. From that position he gradually rose through the grades of fireman, passed fireman, and draughtsman, to be Locomotive Inspector, Running Assistant, and was eventually promoted to be Assistant Superintendent Mechanical in 1910. In 1915 he was transferred to Port Elizabeth and two years later was promoted to be Mechanical Assistant on the General Manager's staff. He was promoted Superintendent, Motive Power, in 1923, and 10 years later, attained his present position of Chief Superintendent, Motive Power. During his period of service on the railways, Mr. Titren has visited many countries, and it was largely due to a report he submitted after visiting Tasmania, New Zealand, and Australia, that Garratt engines were introduced into South Africa. He suggested to the late Sir William Hoy that the special train conveying himself and General Smuts to Cape Town in 1922, be run at special fast timings to ascertain what could be accomplished between Johannesburg and Cape Town. The Union Limited and Express trains were the outcome of Mr. Titren's suggestion. Since he was transferred to Johannesburg in 1917, he has assisted in building up the locomotives from comparatively small machines to the very large engines in service today. He was also responsible for the introduction of grease lubrication.

An Appreciation of Sir John Aspinall

Sir Nigel Gresley, Chief Mechanical Engineer, L.N.E.R., writing to *The Times*, says:—

"As one of his former pupils of nearly 40 years ago, I would like to add a few words to the appreciation of Sir John Aspinall which appeared in *The Times* last week.

"Only last autumn the Institution of Mechanical Engineers decided to commemorate the bicentenary of the birth of James Watt by the award every two years of a gold medal to an engineer of any nationality who is deemed worthy of the highest award the institution can bestow. It was laid down that, to receive this medal struck in commemoration of one who was a scientist, an inventor, and a producer, the recipient himself should be an engineer who has received international recognition, both by his work as a mechanical engineer and by the ability with which he had applied science to the progress of mechanical engineering. Sir John Aspinall amply fulfilled all these requirements. It was my privilege, as President of the Institution of Mechanical Engineers, to announce to him about six weeks ago, the unanimous decision of the council that the first award of the James Watt Gold Medal should be made to him. It had been decided that the actual presentation should be made in the hall of the institution on January 22.

"A whole generation of engineers owe to him their training and inspiration, and it is a remarkable fact that, when he celebrated his eightieth birthday, three of his former pupils occupied the responsible position of Chief Mechanical Enginer on three out of the four English group railways. A wide circle of colleagues and friends will have grateful recollections of his great intellect and of his singularly gracious and kindly personality."

Sir John Aspinall: Requiem Masses and Burial

Requiem Mass for Sir John Aspinall, sometime Chief Mechanical Engineer and then General Manager of the former Lancashire & Yorkshire Railway, whose death we announced last week, was celebrated at St. Dunstan's, Woking, and was followed by burial at St. Edward's, Sutton Park, on January 22. The service was conducted by Father H. E. Plummer, assisted by the Rev. H. Loader and the Rev. T. Healey. The following were among the members of the family and others present:—

Miss Aspinall (daughter), Mr. and Mrs. S. J. Young (daughter and son-in-law), Mrs. J. B. Aspinall (daughter-in-law), Sister Mary Magdalen (granddaughter), Miss Marion Young (grand-daughter), Miss Hilda Aspinall, Mrs. Winkley, Mrs. C. Maxwell, the Misses K. and C. Creagh (nieces), Major E. T. Aspinall, Mrs. Freda Carr, and Nurse Upfold.

Brig.-Gen. Magnus Mowat (Secretary, Institution of Mechanical Engineers), Major C. H. Montgomery, Mrs. and Miss Giles, Mr. I. S. Dalgleish, Mr. A. McClure Williams, Mr. F. Crompton Peatfield, Mrs. Smythe, Mr. E. H. Gregg, Mrs. George Muir, Miss Blount, Miss Killick, Col. and Mrs. H. S. Rogers, Mr. R. I. Money, Mr. and Mrs. E. J. Wheen, Sir Nigel Gresley, Mr. Bulleid, Miss F. Barry, Mrs. Barnsley Shaw, Mrs. Gustav Musset, Mrs. Keller, Mr. W. Synott, Dr. and Mrs. G. W. M. Pritchett, Mr. W. S. Corbett-Lowe, Mrs. John Pollen, Mrs. Susan Pollen, Mrs. Ames, Mr. J. Guirey, Col. Pasley Lawrenson, Col. and Mrs. H. C. Herbert, Dr. and Mrs. D. W. C. Maile, Dr. and Mrs. R. C. Matson, Mrs. John Poole, Mrs. and Miss Gaskell, Miss Ryan, Mr. J. T. Cornish, Mr. and Mrs. M. K. North, and Mr. R. Fawkes.

Mr. J. G. Wrighton (representing the Smeatonian Society of civil engineers), Mr. H. T. Griggs (representing Dr. H. H. Jeffcott, Secretary, Institution of Civil Engineers, and staff), Mr. J. A. Kay (Editor, The Railway Gazette), Mr. R. A. Riddles (representing Mr. W. A. Stanier, Chief Mechanical Engineer, L.M.S.R.), Mr. F. Mitchell (late Lancashire & Yorkshire Railway), Mr. G. Warburton (late Chief Mechanical Engineer's office, Horwich), and Mr. James Clayton (representing Chief Mechanical Engineer, Southern Railway).

A requiem for Sir John was also held in the Chapel of Holy Souls, Westminster Cathedral. Mgr. Howlett said the Mass. Among those present or represented were:—

Mr. H. A. Aspinall (cousin), Lady (Frederick) Wallis, Sir Charles Morgan (Past President of the Institution of Civil Engineers, also representing Sir Alexander Gibb), His Honour Sir Alfred Tobin, Sir John Thornycroft, Brig.-Gen. Sir Henry Maybury (Past President, Institution of Civil Engineers), Mr. Richard W. Allen (Past President of the Institution of Mechanical Engineers), Dr. H. S. Hele-Shaw, Mr. George Watson, Sir Cyril Kirkpatrick, Sir Seymour Tritton (representing Rendel, Palmer & Tritton, Consulting Engineers), Colonel R. G. Bamford, Mr. J. E. Montgomery (Assistant Secretary, Institution of Mechanical Engineers), Mr. Loughnan Pendred (Editor-in-Chief, *The Engineer*), Miss O. Stoll, Miss E. Stopliss, Mr. W. A. Willox (Chief Assistant Editor, The Railway Gazette), Mr. J. D. Watson (Past President, Institution of Civil Engineers), Mr. William Molyneux Cohan (representing H. E. Moss & Co.), Mrs. Stanislas Eyre, Miss Dorothy Norris, Mr. Herbert G. Riddle (Secretary, Junior Institution of Engineers), Mrs. Walter Johnson, Mr. R. D. Grieves (representing Sir John Snell), Major J. F. X. Miller (War Office), Mr. E. W. Moss and Mr. G. D. Christy (representing Mr. T. Peirson Frank, Chief Engineer and County Surveyor, L.C.C.).

Forthcoming Events

Jan. 30 (*Sat.*).—Permanent Way Institution (London), at Inst. of Civil Engineers, Great George Street, S.W.1, 2.30 p.m. Annual Winter Meeting. Annual Winter Dinner, at Charing Cross Hotel, W.C.2, 6.30 p.m.

Feb. 1 (*Mon.*).—G.W.R. (Birmingham) Lecture and Debating Society, at Great Western Hotel, Snow Hill Station, 6.30 p.m. "Reminiscences," by Mr. C. Shaw.

Feb. 2 (*Tues.*).—Institute of Transport (Metropolitan Graduate), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Transport and Sport," by Mr. E. Tyler.

L.N.E.R. (Newcastle-Sunderland) Lecture and Debating Society, at Newcastle, 7 p.m. "L.N.E.R. Continental Services," by Mr. A. Gibson.

Feb. 3 (*Wed.*).—Southern Railway Eastern Divisional Engineer's Office, at County Hotel, Ashford, 6.30 p.m. Annual Dinner.

Feb. 4 (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, in General Meeting Room, Paddington Station, W.2, 5.45 p.m. Debate with Federation of L.N.E.R. Debating Societies.

Southern Railway Lecture and Debating Society at Chapter House, St. Thomas's Street, S.E.1, 5.45 p.m. "Southampton Docks," by Mr. G. J. Missenden.

Institution of Electrical Engineers, at Grosvenor House, Park Lane, London, W.1, 7 for 7.30 p.m. Annual Dinner.

Feb. 5 (*Fri.*).—G.W.R. (London) Chief Goods Manager's Office, at Chiltern Hall, Chiltern Court Restaurant, Baker Street, N.W.1. Annual Dinner.

Institute of Transport (Leeds), at Town Hall, 6.30 p.m. "Post Office Motor Transport," by Capt. A. Hudson.

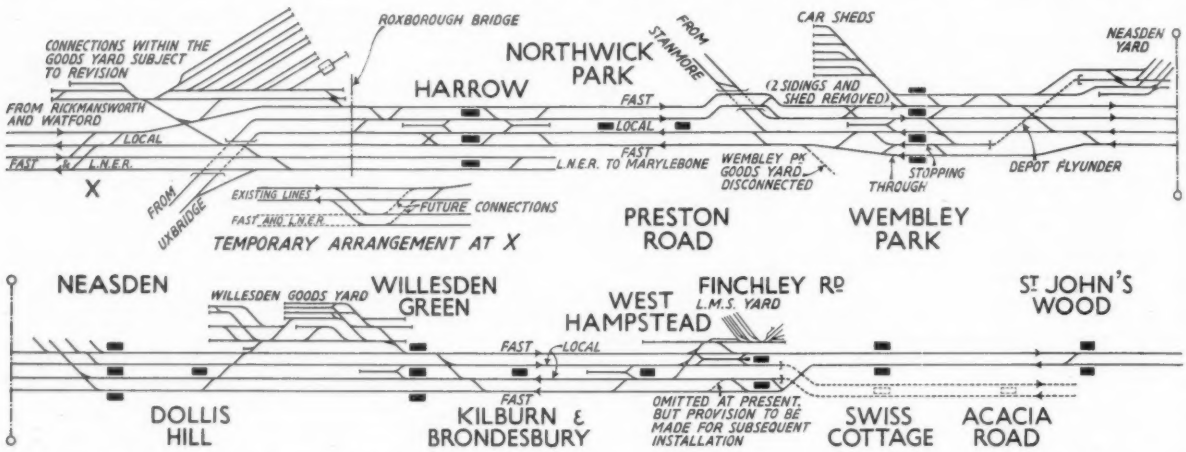
XUM

New Works on the Metropolitan Line of the L.P.T.B.

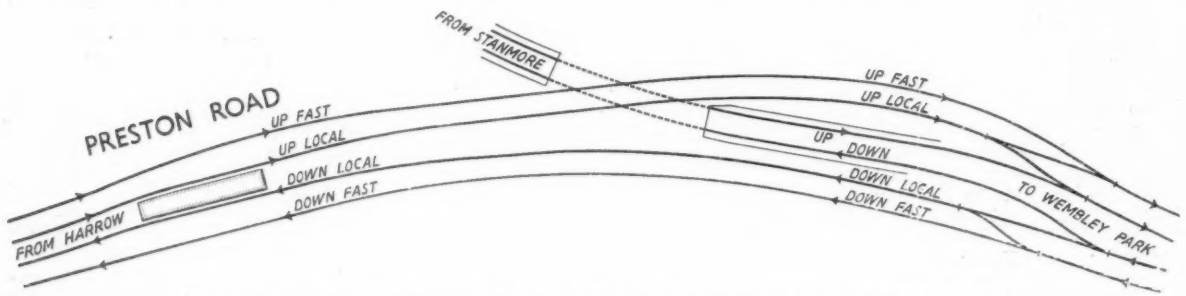
To join the existing Metropolitan Extension line at Finchley Road with the new tube which is to connect with the Bakerloo Line, the tracks of the Metropolitan Extension out to Harrow are being rearranged, involving alterations to stations and the provision of two new burrowing junctions near Wembley Park

Part of the programme of new works now being undertaken by the London Passenger Transport Board is the provision of a new tube connection between the Bakerloo near Baker Street and the Metropolitan Extension line at Finchley Road, thus solving the problem of the Finchley Road—Baker Street bottle-neck. At the present time from Baker Street to Finchley Road, 2 miles, there are only two tracks to carry both fast and local traffic, whereas beyond Finchley Road there are four as far as Harrow, where the Uxbridge line diverges from that to Watford and Aylesbury. This bottle-neck has long been a preventive of the full utility of the four tracks beyond, and in addition is, during the rush hours, apt to be a source of delay to traffic. Further, the intermediate stations on this double line section can be provided with only a relatively sparse train service because of the necessity to leave paths for the fast trains. By the construction of a tube, connecting near Baker Street with the Bakerloo Line, and rising beyond Swiss Cottage to join the surface extension of the Metropolitan Line at Finchley Road, new low level stations to deal with local traffic will be provided at Swiss Cottage, and Acacia Road (near the present Marlborough Road station which will be closed), and it will be possible to reserve the existing lines for the fast trains.

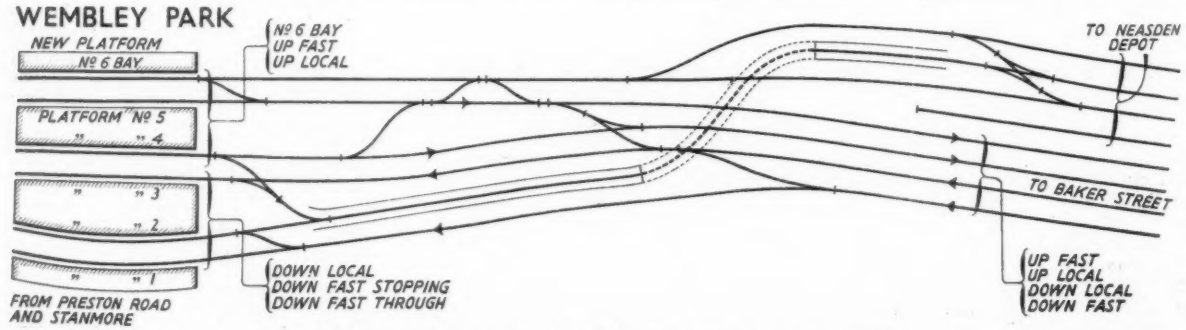
To facilitate the interchange of passengers between fast and local trains, the four tracks northwards of Finchley



Proposed arrangement of tracks between Harrow and Finchley Road on completion of Bakerloo tube link and quadrupling to Rickmansworth. The temporary arrangement at Harrow pending quadrupling is shown separately



New arrangement near Preston Road on completion of Stanmore burrowing junction



New burrowing approach to Neasden depot from down side

Road are to be rearranged as, from west to east, down fast, down local, up local, and up fast respectively. This will necessitate moving the existing platforms at West Hampstead and Dollis Hill from their present positions between the up and down locals (which will become respectively the down fast and down local) to a position between the two local lines. It will also involve the conversion of the present up local platform at Kilburn into an island platform and enable the existing down local platform to be abolished. At Wembley Park itself a new up bay platform will replace the existing terminal bay platform provided to deal with special traffic to the Wembley Stadium.

Just north of Wembley Park a curious situation now exists, designed originally when the Stanmore branch was opened in 1933, the fast and local lines exchanging places, necessitating trains crossing one another's paths. The new allocation of tracks will, of course, obviate this crossing of paths, but, in order to avoid alteration of Preston Road and Northwick Park stations, which at present consist of island platforms between the up and down locals, a new up fast line will be laid through the stations outside the present up local, and one of the existing fast tracks will be removed.

Between Wembley Park and Preston Road a burrowing junction is to be built for Stanmore branch trains, and at the other end of Wembley Park station a similar, but single line, burrowing junction will give access between the Neasden depot and the down side. Finchley Road station will be provided with an additional platform to serve the up trains and will become an interchange station between the Bakerloo and the Metropolitan Extension lines. Interchange facilities will also be provided at Swiss Cottage where the two lines will be on different levels.

Two additional lines will be provided through Harrow station, the present up local and down fast platforms being converted into islands. One of the diagrams also shows the eventual arrangement when quadrupling to Rickmansworth is completed.

SOUTHERN RAILWAY POSTERS.—Continuing its policy of using invention, art, and literature to dispel the terrors of a Channel crossing, the Southern Railway has produced a cheerful poster displaying prominently the slogan: "Dover and you're over." Blue sea and sky, a placid harbour in the foreground, and a mere giant's stride to reach the opposite coast, are so pleasantly presented that thoughts of dark clouds and choppiness are held at bay. Another poster from the Southern Railway advertises the daily all-Pullman services of the Bournemouth Belle in an economical and arresting front-end impression of the train at speed, which catches the eye with its bold colouring.

G.W.R. Superintendent of the Line's Staff Dinner

Mr. F. R. Potter (Superintendent of the Line) presided at the annual dinner and concert of the G.W.R. Superintendent of the Line's office staff on Friday last, January 22, at the Chiltern Hall, Baker Street, N.W., when a record gathering of upwards of 210 members of the present and past staff and their guests attended. The principal guests included:—

Mr. R. Carpmael (Chief Engineer), Sir Ralph Cope (Chief Accountant), Mr. F. C. A. Coventry (Superintendent of Road Transport), Mr. C. R. Dashwood (Assistant General Manager), Mr. H. T. Forth (Assistant Accountant), Mr. K. W. C. Grand (Divisional Superintendent, Swansea), Mr. W. H. Jarvis (Stationery Superintendent), Mr. W. W. Legg (THE RAILWAY GAZETTE), Mr. A. Maynard (Chief Goods Manager), Mr. F. H. D. Page (Signal and Telegraph Engineer), Mr. H. W. Payne (Principal Assistant to Chief Goods Manager), Mr. R. A. P. Setterfield (Hotels and Refreshment Rooms Manager), Mr. H. A. G. Worth (Assistant Advertising Manager, London Passenger Transport Board).

Mr. H. H. Phillips (Excursion Section), in proposing the toast of "The Great Western Railway," mentioned the spirit existing amongst the staff and officers of the company which had contributed in a large manner to the revival and improved outlook during the past twelve months. He was sure that the future would continue to show even better results, and with this in mind he asked the company present to support the toast of the continued prosperity of the Great Western Railway Company.

Sir Ralph Cope (Chief Accountant) in response congratulated the Superintendent of the Line and his staff on the very excellent gathering at their annual dinner. He made special reference to the way in which the trade depression periods of the past years had been surmounted, and to the fact that the future would appear to be full of promise.

Mr. G. E. Orton (Commercial Assistant to the Superintendent of the Line) proposed the combined toast of the "Retired Staff and Visitors." There was a goodly number of retired members present and, whilst it was invidious to make distinctions, Mr. Orton expressed on behalf of the present members the pleasure in seeing so many of the retired staff that evening, but he felt that he must mention the name of Mr. W. C. Simpson, who was now in his 81st year and was the "father" of the present assembly. To all the retired staff and those who may in future be joining their ranks, the wish for long life and happiness was extended. To the visitors, Mr. Orton extended a very hearty welcome.

Mr. E. C. Simpkins, on behalf of the retired staff, and Mr. R. A. P. Setterfield on behalf of the visitors, made suitable responses.

Mr. L. J. Hamblin (Staff Section), in proposing the toast of the Chairman, referred to the affection and esteem in which Mr. Potter was held by the whole of his staff, and made special mention of the fact that he had also been responsible for arranging the excellent programme of entertainment. The toast was acclaimed, amidst great enthusiasm, with musical honours.

Mr. F. R. Potter, in response, took the opportunity of thanking the staff for their presence in such large numbers that evening, and for their ever loyal and ready assistance to him. He said he could not let the evening pass without making special reference to another well known and liked member of the retired staff, *i.e.*, Mr. R. H. Nicholls (late Superintendent of the Line) and he was sure it was the wish of everyone to toast Mr. Nicholls and wish him continued good health and happy retirement. Further musical honours were accorded this special toast. Mr. Nicholls suitably responded in his inimitable light manner.

London East Division Engineer's Staff Dinner, S.R.

Mr. F. E. Campion, Divisional Engineer, presided over the annual dinner of the London East Division staff on January 15. Among those present were:—

Messrs. D. R. Bennett, H. I. Bond, N. E. V. Brady, H. E. Bromley, J. C. Butler, A. H. Cantrell, G. Cheale, A. B. Chester, J. T. Cloke, A. Curtis, A. Dean, L. Furnival, F. I. S. Gill, H. Janes, C. W. King, J. H. Knotts, C. J. C. Latham, F. Lowe, P. Nunn, T. Pease, R. Restall, E. A. Richards, L. G. B. Rock, H. V. Russ, J. Symes, and W. A. Willox.

Mr. King, Assistant Divisional Engineer, in proposing the toast of "The Chairman," remarked that the initials F. E. C. were familiar to all those present. They stood for Fidelity, Efficiency, and Courtesy, as well as for the names of their chief, whose fidelity to the heavy responsibility of maintaining the London East Division and the efficiency with which he discharged it, coupled with the unvarying courtesy displayed to every member of his staff made the combination strikingly appropriate.

Mr. Campion, after reading a message of good wishes from the Chief Engineer, briefly reviewed the work of the past year and the changes that had taken place among the staff. He thanked every section individually for the high standard attained in the discharge of their duties, and mentioned also the friendly relations that existed between the engineers and the other departments of the railway.

Mr. J. T. Cloke, Chief Clerk, in proposing the toast of "The Visitors," particularly welcomed Mr. E. A. Richards, Welfare Assistant, an old friend to whom no-one ever took their troubles in vain. Mr. Richards responded gracefully.

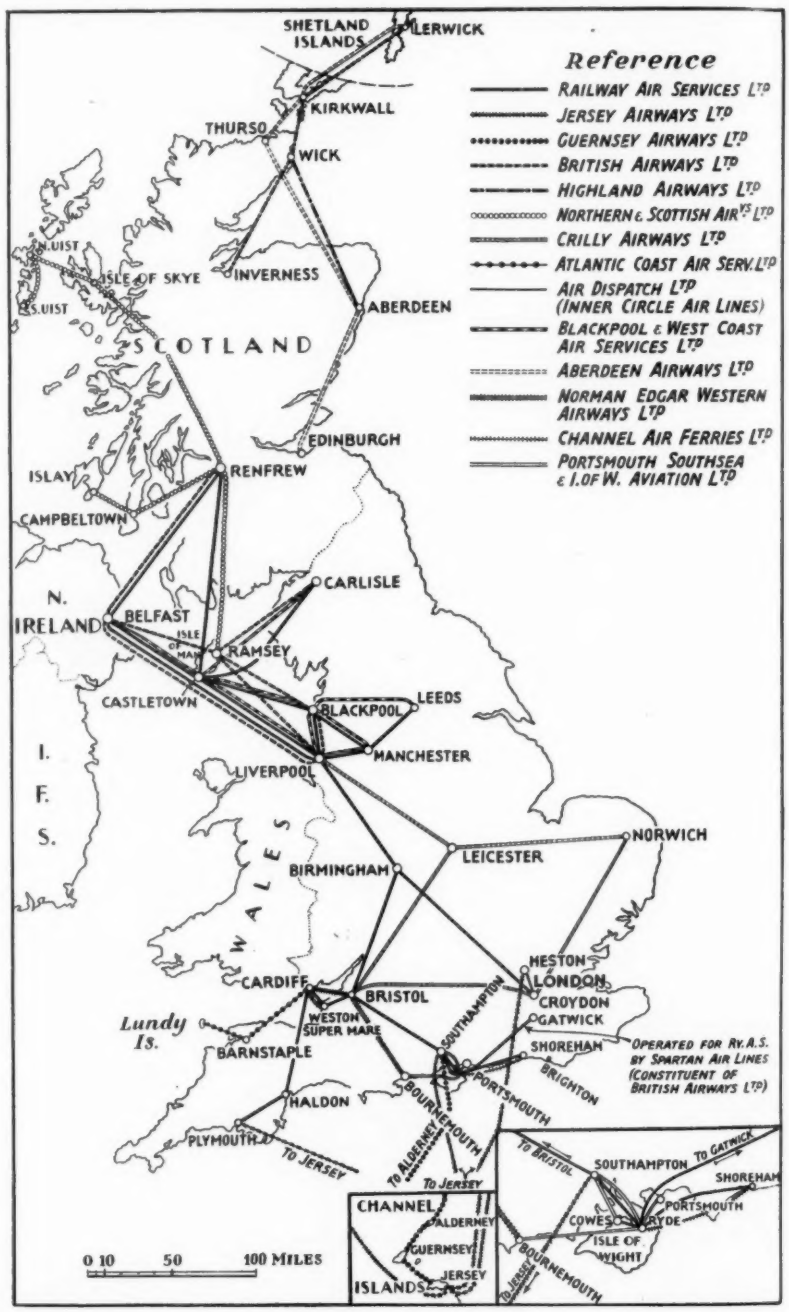
Internal Airways: The Maybury Report

The Maybury Committee was appointed in July, 1935, to consider and report upon measures which might be adopted by the Government or by local authorities for assisting in the promotion of civil aviation in the United Kingdom and their probable cost: also, to take into account the requirements of the Post Office for air mails and the relation between aviation and other forms of transport. The Committee's report, dated December 9, 1936, which has just been published, records that whereas in 1935 there were 19 companies operating 76 services with a route mileage of 7,141, in 1936 there were only 16 companies operating 54 services with a route mileage of 4,019. These services have in most cases been run at a loss and, while the only lines which have continued to operate from 1933 to 1936 are those which cross stretches of water, the committee points out that they are not necessarily financially successful. The commercial aircraft used in the United Kingdom are flying only an average of 600 hours annually, whereas they require to be flown at least double that mileage to secure a financial return. In no case is there any marked saving of time, except where a water-crossing is involved, compared with railway services.

The committee attributes the present unsatisfactory position of commercial flying in this country to inadequate ground organisation, lack of facilities for night flying, poor communications between airports and the cities they serve, and a scarcity of skilled civilian pilots. In its view, air lines to be successful must offer services fast and frequent enough to show a substantial saving in time over alternative methods of transport, be reasonable in cost, be run at convenient hours, and be as regular and punctual as alternative means of travel. The committee considers that the conditions under which air lines have hitherto been operated do not show whether it would be possible under suitable operating conditions to run them at a profit, and expresses the view that so long as wasteful competition continues and services are unduly limited in frequency, regularity and convenience, it is unlikely that air transport will pay its way.

Air services in the British Isles, it is suggested, can be operated on a financially self-supporting basis only if cut-throat competition is eliminated and some measure of restriction applied to avoid indiscriminate multiplication of services. The committee, therefore, recommends that there should be a provisional regulation of selected routes to ensure that services may be given the maximum opportunity of becoming self supporting, and supplying that confidence in air travel which is at present lacking. For this purpose the committee propounds a scheme whereby a number of services would radiate from a junction and so give connections to all distant stations without through services to any of them. By this means a route mileage of 2,900 which would be required to link these places independently, could be reduced to 960 miles. The committee accordingly recommends that a junction should be created near Manchester and Liverpool from which services should be run to Belfast, Glasgow-Edinburgh, Newcastle, London, Portsmouth-Southampton, and Bristol. A further suggestion is that an exclusive licence should be granted for five years to a single company or combination of companies working these routes in the closest co-ordination, and that a licensing authority should be appointed to select the operating body or bodies and to grant licences which need not be exclusive on other routes.

The committee estimates that a



Map of the internal air lines of Great Britain in the summer of 1936, based on that in the Maybury report

schedule of four round trips a day over the routes mentioned would require 16 14-seat aircraft, each flying about 1,500 hours annually. It is not intended that the operating company should be subsidised, but the committee recommends that the Government should provide, maintain, and operate all radio facilities, a meteorological organisation, and a comprehensive air traffic control organisation adequate to secure the safety and regularity of air services. The capital cost of carrying out this work is estimated at about £320,000 and the total annual cost £240,000. Of this annual cost some £40,000 a year is already being incurred or in prospect. The provision of the necessary equipment, other than radio, to enable aerodromes to be used in safety in all conditions of visibility should be the responsibility of the aerodrome proprietors.

As the great bulk of inland mails is posted towards the end of the day, there is only limited scope for the development of inland mails conveyed by air so long as regular night flying is impracticable. The committee records that a special committee appointed by the Postmaster General reached the conclusion that owing to the geographical characteristics of the country, and the excellent railway facilities which it enjoys, the scope for large scale improvements in the postal services through the utilisation of air services is inevitably limited. If suitable night flying services could be arranged, however, interlocking with the system of railway travelling post offices, material accelerations could be effected in certain cases. The committee, therefore, recommends that, as a beginning, so soon as the necessary ground organisation is completed, night mail services between London and Glasgow-Edinburgh, and London-Belfast should be instituted.

The committee also states that London is likely to be served shortly by seven aerodromes and, on the ground that no single aerodrome could handle the whole of London's air traffic, it is opposed to the creation of a central aerodrome. It also states that the dimensions of standard aerodromes which are necessary for safety are such as to make roof aerodromes unattractive for the types of aircraft now in use.

The committee mentions that the two largest groups operating within the country are Railway Air Services Limited, which was formed by the four main-line railways in conjunction with Imperial Airways, and British Airways Limited. Incidentally, attention is drawn to the advantages to be derived from the close association between the railway companies and air travel as exemplified by some of the facilities provided in connection with Railway Air Services and its allied companies. These include ample booking facilities throughout the country, inter-availability of rail or air tickets, simplification of baggage arrangements, and the provision of terminal facilities. The report may be considered disappointing in that it contains little that is new, but it is gratifying to the railway companies as being an endorsement of the policy pursued by Railway Air Services Limited since its formation.

Staff and Labour Matters

New Claim by the N.U.R.

There has recently been much uninformed comment concerning the new claim which the National Union of Railwaymen contemplates making to the railway companies. Covert, and, in some cases open, hints of a "rail strike" and "rail crisis" have been mentioned, and we were therefore glad to read an authoritative pronouncement on the question by the General Secretary of the Union. Mr. Marchbank, writing last week in the *Railway Review*—the union's official organ—uttered a well-merited rebuke to those who perceive the seeds of "deadlock" in every phase or development of a programme claim. He said: "We shall of course conduct our case through the normal channels of negotiation with the companies. It will not be necessary, I hope, to pursue the negotiations in an atmosphere of crisis. As we have barely reached the opening stage of discussion, there is no necessity to talk of possible deadlock or of drastic action to enforce our claim. My personal view is that the growing volume of traffic and the immense expenditures on railway development afford encouragement for the hope that a reasonable settlement will be reached in due course. The upward trend in industry and trade will go on, I believe, with accelerated speed during the present year, and the union is determined that wages shall not lag behind."

The Railway Staff National Tribunal has made quite clear the position regarding the presentation of claims to the railway companies. In Decision No. 1, dated July 27, 1936, which made certain concessions to all conciliation and salaried grades, the tribunal pointed out that these concessions "would preclude either party asking for a review of the situation before the termination of the twelve months, and in ample time to enable any further change, if justified, being made operative at the termination of that period."

In its last Decision (No. 2), dated December 29, 1936, which found against all the items of the claim of the Associated Society of Locomotive Engineers and Firemen, the tribunal was at pains to point out "that consideration of the financial situation, with a view to new negotiations, can begin as soon as the completed accounts for 1936 are available; that the improvement which the tribunal anticipated in July has not only been confirmed but has proceeded rather further than was then anticipated; that though it is impossible to forecast future results with certainty or to prejudice a future decision, the prospects of an application in regard to a further restoration of standard rates, if made at the appropriate time, would therefore at present appear favourable. As the Tribunal pointed out in July, even if negotiations are not successful at the earlier stages, there is nothing to prevent them being begun early enough to ensure that a new application comes to the tribunal in ample time for any further change, if justified, being made operative at the termination of the period of a year (ending in August next) for which Decision No. 1 was prescribed."

These two statements, together with the pronouncement of Mr. Marchbank, plainly indicate the course which will be followed. It does not appear likely that the union's claim will be submitted to the companies until after the figures of the 1936 net revenue for each of the four companies have been published.

A.S.L.E.F. Delegate Conference Rejects Tribunal's Decision

A special delegate conference of the Associated Society of Locomotive Engineers and Firemen was in session in London for two days last week considering the Railway Staff National Tribunal's Decision No. 2. At the conclusion of the session on Friday last, January 22, it was officially announced that by 47 votes to 5 the conference had "rejected" the tribunal's findings and had given instructions to the executive committee of the society to reopen negotiations with the companies.

During last week-end there was some speculation as to whether the companies would agree to meet the trade union executive. *The Times* commented on the task of the committee as being "both thankless and hopeless," and went on to observe that "however politely the companies may frame their reply, it can only be in substance that they cannot join with the associated society in throwing over an impartial authority." However, a meeting took place last Tuesday afternoon, January 26, and afterwards the following official communiqué was issued: "Following upon the meeting of the special assembly of delegates of the Associated Society of Locomotive Engineers and Firemen, a meeting was held in London this afternoon between representatives of the four main-line railway companies and the executive committee of the society. A full discussion took place and the meeting was adjourned." No indications were forthcoming as to the trend of the discussions.

RAILWAY AND OTHER MEETINGS

Bengal & North Western Railway Co. Ltd.

The ordinary general meeting of the Bengal & North Western Railway Co. Ltd. was held at Winchester House, Old Broad Street, E.C.2, on January 26, Lt.-Col. T. Gracey, R.E., Chairman of the company, presiding.

The Managing Director (Lt.-Col. W. R. Izat, D.S.O., R.E.) read the notice convening the meeting and the auditors' report.

The Chairman said it was with deepest regret he had to refer to the loss the company had sustained by the death of their late Chairman, Sir H. P. Burt, K.C.I.E., C.B.E., on October 31 last, and also by the resignation of Sir George Sutherland owing to ill-health. Sir Henry Burt had been Chairman for 17 years and devoted himself wholeheartedly to the business of the company, whose progress and success were greatly due to his great technical knowledge, unremitting attention and sound common sense and wisdom in dealing with the many problems that had to be solved in carrying on the business of a railway. The board had to mourn the loss of an ever courteous and far-seeing colleague.

Sir George Sutherland, while not a railwayman, was head of a great firm whose interests, in sugar and other activities, were very prominent in the country their railway served, and he was a source of great help to the board in the advice he could give, especially from the customers' point of view. The board accepted his resignation through ill-health with great regret.

Lt.-Col. A. H. C. Sutherland, O.B.E., M.C., and Sir James Williamson, the company's late Agent in India, had been elected to fill the vacancies on the board. Lt.-Col. Sutherland had just sailed for India, where he would spend a good proportion of his time inspecting works and factories on the railway.

According to the company's contract with the Secretary of State, the latter had the option of purchasing the company's property at the end of 1937 on giving 12 months' notice of his intention to do so. On November 18 the board was asked by the Secretary of State to discuss proposals for the company to continue undisturbed under existing contracts for a brief but unspecified period beyond 1942 (when the Secretary of State had another option to purchase) in return for an unspecified but substantial annual payment by the company to the Secretary of State starting at the end of 1937.

The only terms indicated to the board in informal suggestions were so onerous to the company that the board could not find in them any basis for discussion, and saw no prospect of arriving at any arrangement which it could recommend the shareholders to consider. The matter was therefore dropped, and on December 23 the Secretary of State informed the board that he did not intend to exercise his option in 1937. So the company's contracts continued as at present till 1942.

To the Chairman's mind the present satisfactory working of the railway, and its good relations with the public, were due to a great extent to the railway being managed by a company. Under State control personnel changed at comparatively short intervals, and were always liable to have pressure brought on them to carry out policies which were not for the real benefit of the railway but for political purposes. The Bengal & North Western Railway, and the Tirhut State Railway, under the same control illustrated the success that could attend company management.

The main problems facing the railway were the sugar traffic, steamer and country boat competition, and ticketless travel. The sugar and allied traffics had increased enormously in the last few years, and now appeared to be working smoothly and to the reasonable satisfaction of all concerned. The 150 molasses tank wagons lately put on the line came into full use for the first time last winter and were supplying an adequate solution to what was an urgent need. With regard to steamer and country boat competition, he thought the situation was working towards a solution which would be satisfactory to all parties. Extra staff and other methods were keeping in check, even if they had not reduced, the ticketless traveller problem.

Proceeding to the ordinary business of the meeting, the Chairman said the gross earnings of the joint undertaking amounted to just over 370 lakhs of rupees, being only one lakh short of the record year of 1927, an increase over last year of over Rs. 23 lakhs. On the company's line the gross earnings increased by Rs. 14 lakhs and on the Tirhut line by Rs. 9 lakhs.

Coaching traffic continued to improve, the number of passengers carried having increased by over half a million and the receipts therefrom by over Rs. 1½ lakhs. There was heavy rainfall this season and widespread floods but no serious damage was done except at the Elgin bridge over the Gogra, where the river made a very determined set at the left guide bank and partially scoured out behind the abutment, which entailed an interruption of traffic on the main line for six days in all in August and September last.

The goods traffic continued to show a steady increase, the number of tons lifted being nearly ¾ million more than last year and the receipts increasing by nearly Rs. 17½ lakhs. The principal cause of the increase was due to the development of the sugar industry, but there was also an increase in other general traffic, especially grain, rice and linseed, which was most satisfactory. So far during the current year the tendency continued for a steady increase of goods traffic and a slight increase in coaching.

The decrease in working expenses by just over Rs. 4½ lakhs was principally due to less earthquake repairs and to heavier renewals of permanent way and engines in the previous year. The renewal of 50-lb. rails with 60-lb. rails was progressing steadily according to programme. The percentage of working expenses to gross earnings fell to 43·65 per cent., which was the lowest since 1929.

The company's share of the net earnings as shown in the net revenue account amounted to £900,188, being £106,288 more than last year. After adding the gain by exchange over the book rate of 1s. 6d. per rupee amounting to £5,265, and making the necessary adjustment for income tax, payment of interest on debenture and preference stocks, interim dividend and bonus, and providing as usual the £35,000 for the sinking fund, the amount to be dealt with today was £354,859.

From this the board recommended the payment of a final dividend of 7 per cent. together with a bonus of 3 per cent., making for the whole year a total dividend and bonus of 18 per cent., an increase of 2 per cent. over that paid a year ago. The carry-forward would then be increased from £78,072 to £93,608.

The damage caused by the earthquake had been practically repaired or replaced. There had now been two rainy seasons since the earthquake occurred, and no more damage had come to light, neither did the levels of the country or the beds of the rivers appear to have altered to any appreciable extent. This was a matter of the utmost importance to the company, much of whose line ran along alluvial plains just below the Himalaya foothills. The rivers coming from these hills carried vast quantities of silt, and were constantly building up their beds, and the adjacent country also. The Kosi and Kamla rivers had behaved fairly well, and the only place where there had been real difficulty had been the Elgin Bridge over the Gogra.

No decision had been come to by the local Government as to the flood openings on the Sonepore-Chupra section, but it was hoped to come to some conclusion this year, as it was necessary either to double this section of line or construct another junction line that would relieve it, or possibly even to do both, in the near future.

At present road transport, probably owing to the natural configuration of the country the railway served, was not a really serious factor, but no one knew how long this state of things would continue. On the other hand, from the same configuration steamer and country boat traffic had always been a serious competitive factor and would always remain so. It had several disadvantages, but on the other

hand had advantages in enabling the company to have an alternative outlet to Calcutta and the sea.

The Chairman then proposed: "That the report of the directors, dated January 16, 1937, together with the audited statement of accounts and balance sheets for the year ended September 30, 1936, be, and they are hereby received, approved, and adopted." Sir Leonard L. Cohen, K.C.V.O., seconded, and the motion was carried unanimously.

The Chairman next moved: "That a final dividend of £7 per cent. and a bonus of £3 per cent. for the six months ended September 30, 1936, on the ordinary stock of the company, less income tax, be, and the same are hereby declared, making with the ad-interim dividend of £4 per cent. and a bonus of £4 per cent. paid on July 27, 1936, a total dividend of £18 per cent. for the year ended September, 1936."

The motion, seconded by the Rt. Hon. Lord Meston, K.C.S.I., was carried.

Sir Leonard Cohen proposed the re-election of Lt.-Col. Gracey as a Director; the motion was seconded by Sir Malcolm Hogg and unanimously carried.

The Chairman moved the re-election of Lt.-Col. A. H. C. Sutherland, and the motion, seconded by Sir James Williamson, was carried unanimously.

The re-election of the auditors, Messrs. Cooper Bros. & Company, and Messrs. Gerard Van der Linde & Son, at an annual remuneration of 75 guineas each, was proposed by Mr. R. L. Bliss, seconded by Mr. H. O. Clarke, and carried.

The meeting closed with a vote of thanks to the Directors, Agent, and staff, proposed by Mr. A. F. Rountree, seconded by Miss I. F. P. Monckton, and carried with acclamation.

Midland Railway Company of Western Australia Limited

The ordinary general meeting of the Midland Railway Company of Western Australia Limited was held at Winchester House, Old Broad Street, London, E.C., on January 28, Mr. W. S. Poole, Chairman of the company, presiding.

The Secretary (Mr. William Tait) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said that the results showed no appreciable change from the previous year, but the slight progress in gross receipts reported since 1933 had been continued. The gross receipts were £161,371 compared with £159,574, an increase of £1,797. The corresponding increase of 1935 over 1934 was £1,367, so the gross traffic receipts of the past two years showed a combined improvement of £3,164. Net receipts were lower by £1,742, but were slightly better than they had been for the year to June 30, 1934.

Working expenses were £74,641, against £71,102, an increase of £3,539. The rise was contributed to by the 26,707 additional train-miles run in connection with the abnormal livestock movement caused by the drought. This was mostly one-way traffic, with no compensating carriage of freight on the return journey. The operating ratio was 46·25 per cent., compared with 44·56 per cent. in 1935, and 44·58 per cent. in 1934.

Increases in individual items of traffic were £2,334 in livestock; £288 in passengers, parcels, and mails; and £825 in goods and miscellaneous. The train-mileage went up from 250,141 to 276,858. Earnings per train-mile were 139·89d., as compared with 153·10d. Wheat tonnage was 35,340; in the preceding year it had been 46,717, but that figure included 11,215 tons carried over from the 1933-34 harvest. At the close of the financial year, 3,000 tons remained to be transported.

The credit balance in the revenue account stood at £77,540, against £77,372, an increase of £168. A sum of £10,458 had been charged for loss on exchange, and the debit under this head was £14,283, the reduction being caused by the fact that less money was remitted. The principal item in the account was the sum of £35,000 transferred to depreciation and renewals. The expenditure under this head during the year was £52,004, being an increase of £27,084. This heavy increase was due to a comprehensive programme of renewing and strengthening bridges; relaying with 60-lb. rails; and speeding up re-ballasting. The balance of £31,811, added to the £27,292 at credit at June 30, 1935, gave a total of £59,103 at credit of revenue account. The sum of £29,485 carried forward represented an increase of £2,193 upon what was brought forward in the previous year.

Exchange, at £125½ to £100 sterling, continued to be a heavy drain. The exchange reserve still stood at £35,000, and no further allocation had been made thereto. Owing to the depressed state of agriculture, and the necessity of providing for the heavy exchange loss, the board was still unable to recommend a distribution on the ordinary stock. The agricultural depression still continued.

The Chairman made a special reference to the services of Mr. J. J. Poynton, the General Manager, and his staff. Mr. Poynton had been elected Lord Mayor of Perth for his third term, and hoped to visit London this spring.

Of the first mortgage debenture stock, £3,810 had been redeemed out of receipts, up to the end of the financial year, and a further £1,277 redeemed since then reduced the amount outstanding to £124,278. Altogether, £530,722 of the stock had been redeemed.

The Chairman concluded by saying that the State of Western Australia might fairly be considered to have surmounted the depression and to be well on the way to returning prosperity and expansion. There were hopes of better times for their enterprise, although financial results for the current year were hardly likely to show any improvement over the period under review.

He thought, however, that they might look forward to a substantial increase in the area sown with wheat, with far better financial results to the grower. An increase in the demand for transport facilities might be expected. The Australian wool industry, although the number of sheep and clippings had fallen, was one that recovered very rapidly. Prosperity was returning to the gold mining industry. In 1929 the gold yield of the State was 377,176 ounces. Production costs were lower, and the ouput had increased steadily year by year. The gold yield in 1936 had been 846,000 ounces.

The report and accounts were unanimously adopted.

Accelerating the City of Denver

In the accompanying table is set out the schedule of the City of Denver diesel-electric service of the Union Pacific Railroad of America, as amended from December 13, 1936, and referred to editorially on page 182. The City of Denver sets each consist of twelve cars (two of which are occupied by the power units), including luxurious dining, sleeping and observation cars, as well as ample mail and luggage space. No extra fare is charged for the use of this train, which conveys "coach" as well as Pullman passengers.

Westbound	Start-to-Stop Schedules Distance miles	Time min.	Speed m.p.h.
CHICAGO ...	—	—	—
Clinton ...	138·1	127	65·2
Cedar Rapids ...	81·3	76	64·2
Boone ...	120·8	114	63·6
OMAHA ...	147·7	144	61·5
Grand Island ...	144·1	121	71·5
Kearney ...	42·0	34	74·1
North Platte ...	95·0	77	74·0
Julesburg ...	81·2	67	72·7
Sterling ...	57·5	55	62·7
La Salle ...	93·6	81	69·3
DENVER ...	46·1	47	58·8

Eastbound	Distance miles	Time min.	Speed m.p.h.
DENVER ...	—	—	—
La Salle ...	46·1	42	65·9
Sterling ...	93·6	77	72·9
Julesburg ...	57·5	46	75·0
North Platte ...	81·2	63	77·3
Kearney ...	95·0	71	80·3
Grand Island ...	42·0	34	74·1
Columbus ...	62·0	46	80·9
OMAHA ...	82·1	79	62·3
Boone ...	147·7	140	63·3
Cedar Rapids ...	120·8	113	64·1
Clinton ...	81·3	77	63·3
CHICAGO ...	138·1	140	59·2

XUM

NOTES AND NEWS

New Paris Metro Line Opened.—On Wednesday, January 27, one of the new Paris Metro lines was opened, namely, Ligne No. 14, from Place Bienvenüe to Porte de Vanves.

New L.M.S.R. Edinburgh Suburban Station.—The L.M.S.R. announces that, on February 1, it will open a new station called House o' Hill, near Davidson's Mains, on the Princes Street to Barnton branch.

Accident Near Katowice.—As a result of a passenger train jumping the points at Myslowice, near Katowice, Poland, on January 15, and colliding with a goods train, seven persons are reported to have been killed and 42 injured.

Railway Bills in Parliament.—Compliance with Standing Orders is reported in the case of the petitions for the following Bills which are intended to originate in the House of Commons: Great Western Railway; London & North Eastern Railway; London Midland & Scottish Railway; London Passenger Transport Board; Southern Railway.

United States Railwaymen's Demands.—The result of the recent conference of the executives of the railway unions in Chicago, is a demand for 20 per cent. increase in wages, a 5-hr. day, and a 30-hr. week. Altogether 300,000 engine-, train-, and switch-men were represented at the conference. The next move must, by law, come from the companies, whose representatives must meet those of the men within 30 days of receiving such demands, or the matter be referred to the Railway Labour Board. The 20 per cent. increase alone represents an additional £23,300,000 p.a. in wages.

The Zugspitzbahn Merger.—According to a press message from Berlin, the Austrian Zugspitzbahn, the cable suspension line on the Austrian side to the summit of the Zugspitze, has been acquired by the Bavarian Zugspitzbahn Company for 1,450,000 schillings (about £55,000). The Austrian undertaking is stated to have been in financial difficulties for some time past, but the sale of the railway was previously opposed by the Austrian Government. On page 584 of our issue of October 9 last we published an illustration showing a cable car approaching Gipfelstation, the upper terminus of the Austrian Zugspitzbahn, which is 2,805 metres (9,203 ft.) high.

Channel Train Ferry.—Sir Harry Brittain, speaking last Wednesday at the annual dinner of the Dover Chamber of Commerce, paid a tribute to the smooth working of the Dover-Dunquerque train ferry service which, although exceptional gales and fog had been experienced since its inauguration, on the inward journey had run 93 out of a booked 102 trips, and carried 7,000 passengers. On the outward journey it had run 95 times, been cancelled seven times, and carried 7,750 passengers. Sir Harry Brittain said he had travelled by the ferry service in both directions, and never wished for more excellent rolling stock or greater comfort for sleeping.

Switchgear & Cowans Limited.—On January 20 the London office of Switchgear & Cowans Limited was transferred to 85, Gracechurch Street, London, E.C.3. The telephone number is Mansion House 9156.

Bugatti News.—The P.L.M. Railway has ordered five double-engined 400 b.h.p. Bugatti railcars, in which the direct drive principle has been superseded by a Cotal electro-magnetic gearbox. The seating capacity will be 68. One or two cars of the same general design, but seating 80 passengers on a weight of 31 tonnes, have just been delivered to the French State Railways.

Reconditioning G.W.R. Channel Islands Steamships.—Two G.W.R. vessels used on the Channel Islands service, the *St. Julien* and the *St. Helier*, are to be reconditioned in readiness for the holiday traffic. More covered accommodation will be provided for passengers of both classes, as well as more room for the service of meals and refreshments. The number of berths will also be increased from 353 to 375. Both ships will be ready for the daily holiday service in June.

Southampton Docks Rating.—A King's Bench Division Divisional Court discharged on January 21, with costs, a rule nisi for a writ of certiorari obtained by the Corporation of Southampton, directing the Railway Assessment Authority to show cause why it should not bring up to be quashed entries relating to the Southampton docks undertaking in the Southern Railway revised valuation roll. The Court also discharged, with costs, a rule nisi for a mandamus directing the Assessment Authority to determine the value of the dock undertaking according to the statutes. Lord Hewart, in the course of his judgment, said that the Assessment Authority had neither refused to perform its duty nor committed any excess of jurisdiction in purporting to perform that duty.

Leopoldina Railway Loan.—The Brazilian Government, according to Reuters, has decided to help the Leopoldina Railway with a loan. President Vargas, in a message to the Chamber, has requested authorisation to grant the company a loan of 23,500 contos (£287,500 at the free market rate). The chief of staff of the Brazilian Ministry of Communications has issued a statement on the matter, saying that in view of the company's assertion that a difficult situation existed, he appointed a special commission to look into the company's affairs. After a meticulous examination, he said, the commission presented a report showing that salary adjustments and increasing competition from other railways had placed the company's finances in a critical condition. The Government, he added, had decided to help the company with a loan instead of rescinding its contract.

The Northern Belle.—The L.N.E.R. announces that the Northern Belle cruising train will make two cruises of Scotland during June of Coronation year. The Northern Belle train, which includes sleeping cars, restaurant cars, lounge cars, shower baths, &c., will visit the principal points of historic and scenic interest in Scotland including Loch Lomond, the Trossachs, the Pass of Killiecrankie, and Loch Ness.

Cordoba Central Railway.—Resolutions in favour of altering the memorandum of association of the Cordoba Central Railway Company in order to authorise a sale of its property for a consideration in Argentine Government bonds, were passed on January 25 at a meeting of holders of the company's consolidated income stock and also at an extraordinary meeting of the company held later in the same day.

Institution of Railway Signal Engineers.—At a meeting in London on January 27 a paper, "The Design of Signal Structures," was read by Messrs. H. Birchenhough and J. Wright, of the Signal and Telegraph Engineer's staff, L.M.S.R., which dealt at length with the theory of the subject, with illustrations of typical posts, brackets, and gantries. The following spoke in the discussion: Messrs. E. W. Hallam, S. Williams, J. E. Candler, A. W. Woodbridge, C. M. Hitchcock, P. A. Langley, and the President, Mr. W. S. Roberts. Mr. H. M. Proud, Vice-President, announced that the proposed summer meeting cruise to Stockholm and Copenhagen had been found not quite to meet requirements, and it was contemplated to arrange for one to Hamburg and Antwerp instead, if sufficient support were forthcoming. The annual general meeting will be held in London on February 24.

Modernising L.M.S.R. Engine Sheds.—Nine additional schemes for the modernisation of motive power depots on the L.M.S.R. are to be carried out this year. The programme, which provides for the installation of mechanical coaling and ash-dispcsal plants and other new machinery, together with improvements in the layouts of the sheds so as to give a quicker turn-round of locomotives, comprises Carlisle (Kingmoor), Perth, Newton Heath (Manchester), Aintree (Liverpool), Mold Junction, Goole, Huddersfield, Stafford, and Stranraer. During the past year the L.M.S.R. has completed similar schemes at 15 motive power depots, namely, Sheffield (Grimesthorpe), Derby, Nottingham, Leeds, Bolton, Accrington, Bedford, Camden (London), Rose Grove (Lancs), Lostock Hall (near Preston), Lower Darwen (Lancs), Preston, Agecroft (near Manchester), Low Moor (near Bradford), and Bank Hall (Liverpool).

QUESTIONS IN PARLIAMENT

Liverpool Street to Enfield Electrification

Mr. Hore-Belisha (Minister of Transport) on January 27 informed Mr. Robert Morrison (Tottenham N., Lab.) that he would ascertain from the Standing Joint Committee of the London & North Eastern Railway Company and the London Passenger Transport Board whether any progress had been made with the proposal for the electrification of the Liverpool Street to Enfield line, and whether a definite scheme had been or was being prepared.

Cheaper Travelling Facilities

Mr. H. Day (Southwark Central, Lab.) asked the Minister of Transport whether he would make representations to the Railway Rates Tribunal for the purpose of seeing whether some concession in the way of cheaper travelling facilities than those now operating could be granted to young persons working in the area of the County of London.

Mr. Hore-Belisha replied that he had no power to make such representations, but Parliament had authorised the local authorities to apply to the Railway Rates Tribunal for modification of the fares charged in the London Passenger Transport area or the conditions applicable to such fares.

Renewal of "A" and "B" Licences

Captain Strickland (Coventry, C.) asked the Minister of Transport whether, in view of the evidence given on behalf of the Railway Companies when objecting to the renewal of "A" and "B" licences that it was the intention of His Majesty's Government to use the provisions of the Road and Rail Traffic Act, 1933, in order to reduce the number of such vehicles on the roads, he would make a statement on the matter to explain the attitude of his Department and their intentions in future.

Mr. Hore-Belisha said in reply that no such statement by him would be proper in a matter which had been determined by Parliament itself.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 3rd Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
L.M.S.R. (6,914½ mls.)	£	£	£	£	£	£
Passenger-train traffic...	359,000	361,000	– 2,000	1,092,000	1,084,000	+ 8,000
Merchandise, &c. ...	468,000	437,000	+ 31,000	1,392,000	1,347,000	+ 45,000
Coal and coke ...	289,000	293,000	– 13,000	844,000	906,000	– 62,000
Goods-train traffic ...	748,000	730,000	+ 18,000	2,236,000	2,253,000	– 17,000
Total receipts	1,107,000	1,091,000	+ 16,000	3,328,000	3,337,000	– 9,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	241,000	237,000	+ 4,000	737,000	725,000	+ 12,000
Merchandise, &c. ...	321,000	312,000	+ 9,000	951,000	953,000	– 2,000
Coal and coke ...	268,000	276,000	– 8,000	775,000	830,000	– 55,000
Goods-train traffic ...	589,000	588,000	+ 1,000	1,726,000	1,783,000	– 57,000
Total receipts	830,000	825,000	+ 5,000	2,463,000	2,508,000	– 45,000
G.W.R. (3,746½ mls.)						
Passenger-train traffic...	148,000	152,000	– 4,000	475,000	472,000	+ 3,000
Merchandise, &c. ...	182,000	180,000	+ 2,000	551,000	536,000	+ 15,000
Coal and coke ...	116,000	124,000	– 8,000	350,000	372,000	– 22,000
Goods-train traffic ...	298,000	304,000	– 6,000	901,000	908,000	– 7,000
Total receipts	446,000	456,000	– 10,000	1,376,000	1,380,000	– 4,000
S.R. (2,153 mls.)						
Passenger-train traffic...	244,000	237,000	+ 7,000	745,000	721,000	+ 24,000
Merchandise, &c. ...	54,000	57,500	– 3,500	162,000	170,000	– 8,000
Coal and coke ...	35,000	42,500	– 7,500	102,000	122,000	– 20,000
Goods-train traffic ...	89,000	100,000	– 11,000	264,000	292,000	– 28,000
Total receipts	333,000	337,000	– 4,000	1,009,000	1,013,000	– 4,000
Liverpool Overhead ... (6½ mls.)	1,175	1,181	– 6	3,666	3,625	+ 41
Mersey (4½ mls.) ...	4,202	4,090	+ 112	13,359	12,874	+ 485
*London Passenger Transport Board ...	549,500	531,400	+ 18,100	16,801,400	16,323,400	+ 478,000
IRELAND						
†Belfast & C.D. pass. (80 mls.)	1,561	1,758	– 197	5,676	6,267	– 591
" " goods	400	492	– 92	1,337	1,616	– 279
" " total	1,961	2,250	– 289	7,013	7,883	– 870
Great Northern pass. (543 mls.)	6,900	7,200	– 300	22,950	23,300	– 350
" " goods	9,000	9,650	– 650	26,150	29,650	– 3,500
" " total	15,900	16,850	– 950	49,100	52,950	– 3,850
Great Southern pass. (2,075 mls.)	24,479	24,022	+ 457	78,918	79,132	– 214
" " goods	43,170	37,878	+ 5,292	137,253	132,117	+ 5,136
" " total	67,649	61,900	+ 5,749	216,171	211,249	+ 4,922

* 30th week. † 4th week.

British and Irish Railways Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices Jan. 27, 1937	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	64¼	45½	61¾	–¾
5% Con. Prefce ...	126½	116¾	125	–1
5% Red.Pref.(1950)	113	108½	111½	—
4% Deb.	119½	110½	110	–1
4½% Deb. ...	121	114	116½	–1
4½% Deb. ...	129	121	121½	–3
5% Deb.	141	134	132½	–2
2½% Deb. ...	79⅛	74	75½	—
5% Rt. Charge ...	136½	130	131	–1
5% Cons. Guar. ...	135¼	127¾	131	–1
L.M.S.R.				
Ord.	35⅝	17	32½	+¼
4% Prefce. (1923)	83	52½	78½	–1
4% Prefce. ...	92¾	81	88	–1
5% Red.Pref.(1955)	109¼	103¼	107	—
4% Deb.	111¼	105 9/16	104	–1
5% Red.Deb.(1952)	119⅝	115½	115½	–1
4% Guar. ...	106¾	101⅝	100	–1
L.N.E.R.				
5% Pref. Ord. ...	14	9	11½	+½
Def. Ord. ...	7¼	4¾	5¾	+¼
4% First Prefce.	79¼	55¼	76	–1
4% Second Prefce.	31⅞	18¼	26½	–½
5% Red.Pref.(1955)	100½	77¾	100	—
4% First Guar. ...	104½	98¾	98*	–1
4% Second Guar.	99	90	93*	–1
3% Deb.	85¾	79	79½	–1
4% Deb.	109¾	104½	103½	–1½
5% Red.Deb.(1947)	116¼	110½	112½	—
4½% Sinking Fund Red. Deb.	111½	107½	109½	—
SOUTHERN				
Pref. Ord. ...	98¾	82½	98	—
Def. Ord. ...	27⅝	20⅛	26½	+1½
5% Prefce. ...	120¾	118½	123	–1½
5% Red.Pref.(1964)	119¾	115¼	117½	—
5% Guar. Prefce.	136	129½	131	–1
5% Red.Guar.Pref. (1957)	120	115¾	117½	—
4% Deb.	117 5/16	109½	109	–1
5% Deb.	140	134	134½	–1
4% Red. Deb. 1962–67	116½	110	112½	—
BELFAST & C.D.				
Ord.	9	4½	5	—
FORTH BRIDGE				
4% Deb.	107	105	104½	—
4% Guar. ...	107 5/16	104	104½	—
G. NORTHERN (IRELAND)				
Ord.	19½	9¾	12	—
G. SOUTHERN (IRELAND)				
Ord.	63	41	50	–2
Prefce.	65	46	58	–2
Guar.	97¼	81	94½	—
Deb.	99¾	83¼	93	–½
L.P.T.B.				
4½% "A" ...	127¾	121	121½	—
5% "A" ...	138¼	133½	132½	–1
4½% "T.F.A." ...	111½	108⅛	107	–1
5% "B" ...	131¾	123¾	122½	–1
"C"	112½	93	97	+1
MERSEY				
Ord.	40¾	23	39½	—
4% Perp. Deb. ...	103	98	100*	—
3% Perp. Deb. ...	78	74⅝	76½*	—
3% Perp. Prefce.	68⅞	63¼	67½	—

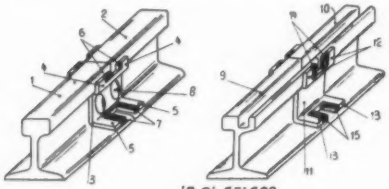
* ex dividend

ABSTRACTS OF RECENT PATENTS*

No. 451,498. A Welded Joint for Rails and Girders

Pietro Forcella, of Via Agostino Depretis No. 82, Rome, Italy. (*Convention date January* 10, 1935.)

The ends 1 and 2 of two ordinary rails are placed in contact and connected by means of the cheeks 3, on the upper edges of which are provided the branches 4 embracing the rail head, while the lower edge is formed with

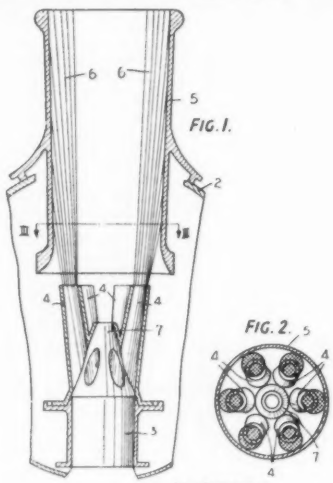


branches 5 resting on the upper face of the rail foot. Two weld inserts 6 are placed between the branches 4, these inserts being connected and welded to the inner side of the branches. Weld inserts 7, are placed in the space between the branches 5. The joint may be completed by the safety bolts 8. The upper branches 4 are shorter than the branches 5 to allow the free passage of the wheel flange. In jointing tramway rails, the upper branches of the inner side have the same height as those of the outer side, as the flange in this case does not limit the size of the branches. The figures 9 and 10 denote the adjacent ends of the rails; 11 is the cheek provided with upper flanges 12 and lower flanges 13, against which the weld inserts 14 and 15 are applied.—(*Accepted July* 31, 1936.)

No. 452,636. Locomotive Blast Pipes

Maurice Lemaitre, of 105 *Rue du Basson, Marcinelle, Belgium.* (*Convention date: February* 26, 1935.)

In a smokebox 2 of a locomotive a steam exhaust pipe 3 carries at its upper end a device for directing steam jets on to the walls of the smokestack 5. This device comprises a number of nozzles 4 arranged in a ring and spaced from one another in order that the smoke can pass easily between them to the interior of the ring. The nozzles are inclined outwardly so as to diverge in an upward direction, the inclination being such that the jets of steam meet the walls of the smokestack at a short distance above the nozzles. Two of these steam jets are shown in Fig. 1 and are indicated by 6. The jets of steam which emerge from the nozzles 4 remain for a certain length of time quite distant one from the other owing to the considerable distance which separates the nozzles from which they emerge. The smoke can thus easily pass towards the centre of the smokestack 5 between these jets, which

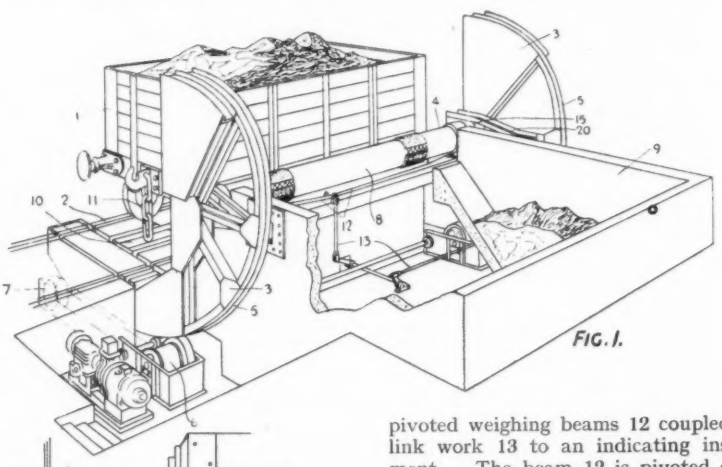


meet the walls of the stack at the level of the section III in Fig. 1. Higher up the stack 5 these jets flatten against the walls and prevent the smoke from coming into contact therewith. At the outlet of the stack the smoke which is in the centre of the stack mixes with the steam owing to the eddies produced by the flattening-out process.—(*Accepted August* 26, 1936.)

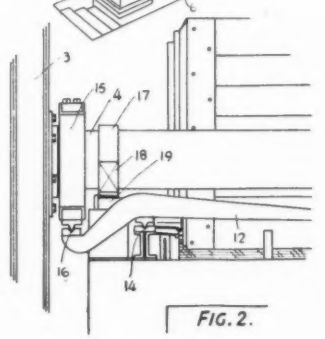
No. 453,487. Wagon Tipping Apparatus

The General Electric Co. Ltd., of Magnet House, Kingsway, W.C.2, and Robert Robson Fraser and Chalmers Engineering Works, Erith, Kent. (*March* 8, 1935.)

In a wagon tipping apparatus the wagon 1 rests on a platform 2. The rocking cradle comprises two rocking arms 3 provided with trunnions 4 which rotate to effect tipping of the wagon. Rotation is effected by cables wound round the arcuate portions 5 of the rocking arms 3. A motor driven winding drum 6 is provided for each rocking arm, the cables passing over pulleys 7 and on to their associated winding drums 6. When the cradle is rocked from its normal position it picks up the platform 2 with the wagon 1, and so tips the wagon about a bolster 8 and directs the contents into a hopper 9. When in the inverted position the wagon is secured in the cradle by a device 10 which grips the chain 11. The weighing mechanism includes two



pivoted weighing beams 12 coupled by link work 13 to an indicating instrument. The beam 12 is pivoted on a knife edge 14. The trunnion 4 is journalled in a member 15 which carries a knife edge 16. The member 15 is carried by a horizontal arm 20 pivoted to the side of the hopper 9, the trunnion 4 being provided with a cam 17 which is circular except for a flat 18 which rests on a collar 19 in the untipped position, and in this position the edge 16 is raised clear of the beam 12 and no load is applied to the weighing mechanism. During the tipping operation the cam 17 rotates until the flat 18 reaches the roller 19. The member 15 then drops until the knife edge 16 engages the beam 12. The cam is now clear of the roller 19 and the cradle is entirely supported by the weighing beam 12. At this stage none of the contents have been tipped into the



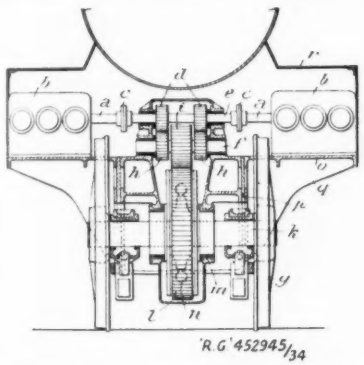
* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. either sheet by sheet as issued, on payment of a subscription of 5s. a group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s. each.

hopper 9. Since the rocking cables 3 are led off from the rocking arms in a horizontal direction to the trunnions 4 they do not apply any load to the weighing beams. This horizontal reaction is taken by the pivots of the arms 20. By the time the cradle has reached the position at which the contents of the wagon begin to empty into the hopper 9, the circular portion of each cam 17 engages its associated roller 19, and so transfers the support of the cradle from the weighing beams 12 back to the rollers 19. When the cradle finally reaches its normal position, the knife edges 16 are once more raised clear of the weighing beams 12. The weighing mechanism is thus not continuously loaded when the cradle is in its normal position.—(*Accepted September* 8, 1936.)

No. 452,945. Locomotives driven by High-speed Piston-operated Engines

Schweizerische Lokomotiv-und-Maschinenfabrik, of Winterthur, Switzerland. (*Convention date: Germany, June* 28, 1934.)

The crankshafts *a* of the two double-acting parallel flow steam engines *b* are each provided with three collateral horizontal cylinders, and are coupled to a main pinion shaft *e* carrying two

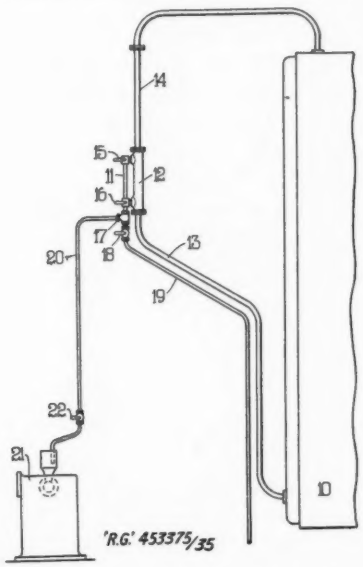


driving pinions *d* through the intermediary of elastic couplings *c*. The use of a counter driving shaft *f* permits the crankshaft *a* to be arranged across the driving wheels *g* without encroaching on these wheels, even in cases where a predetermined ratio of gearing is to be provided between the engine *b* and the driving wheels *g*, and the diameters of the driving wheels and the gear wheel *l* are to have prescribed lengths. The gear wheels *i* and *h* are secured on the shaft *f*. The wheel *i* is in mesh with the large hollow gear wheel *l*, which surrounds the driving axle *k* and which is mounted in the main frame at *m*. The transmission of power from the wheel *l* to the driving axle *k* is effected by means of a universally movable coupling, which is built into the hollow gear wheel, the arms *n* being firmly connected to the driving axle. The auxiliary frame *o* is rigid with the main frame *p*, by using brackets *q* for this purpose, which may extend downwardly. The engines *b* are completely encased and an inspection platform *r* of sheet iron is provided, access to the engines being obtained through easily removable covers. This driving arrangement for the independently driven axles in conjunction with high pressure steam, permits of obtaining driving efforts up to 1,200 h.p. per axle; thus a total driving effort of 4,800 h.p. is available for a high-pressure locomotive with four driving axles. If desired one of the driving axles may be actuated by an exhaust steam turbine instead of a piston operated engine.—(*Accepted September* 2, 1936.)

No. 453,375. Water Gauge Glasses for Boilers

Arthur John Grimmett, of 65, *West Bank Road, Birkenhead.* (*June* 18, 1935.)

In a gauge glass mounting situated some distance from a boiler 10, a gauge glass 11, and a stand pipe or column 12 are arranged, whilst a conduit 13 is provided between the stand pipe 12 and the base of the boiler 10, and a conduit 14 is provided between the upper end of the stand pipe 12 and the steam space of the boiler. Shut-off cocks 15 and 16 are provided in the usual way for controlling the flow of steam and water from the column 12 through the



glass. A T-piece 17 situated between the cock 16 and the drain cock 18 of a drain pipe 19 forms a connection between the gauge glass 11 and a conduit 20 leading to a tank 21 and a feed pump for conducting water passing along the conduit 20 back to the boiler 10. As long as the cock 16 of the water gauge glass is open and the drain cock 18 closed, a continuous drain of water takes place from the boiler 10 through the uptake 13 to the glass 11, thence through the T-piece 17, the conduit 20, the tank 21, and finally back to the boiler, this path constituting a complete hydraulic circuit. As a result the reading of the gauge glass is strictly in accordance with the level of water in the boiler, since the variation in temperature and density between the water in the gauge glass 11 and conduit 13, and the water in the boiler 10, are prevented A hand controlled cock 22 may be provided in any suitable part of the pipe line 20, but if desired, this manually controlled cock may be replaced by a thermostat control whereby the flow of water through the conduit 20 depends on its temperature; the higher its temperature the smaller the flow of water through the conduit and *vice-versa*.—(*Accepted September* 10, 1936.)

COMPLETE SPECIFICATIONS ACCEPTED

452,431. Woodforde, J., and Westinghouse Brake & Saxby Signal Co. Ltd. Systems for the remote control of railway signals and the like.

452,509. Tennant, W. J. (Tatra Works Limited, Motorcar and railway carriage and wagon builders). Motor and driving-wheel arrangements for electrically-driven vehicles.

452,980. Rogers, W. D., Leversedge, G. H., and Sykes Interlocking Signal Co. Ltd., W.R. Traffic-control systems for single-line railways and the like.

453,004 Lockwood & Carlisle Limited, and Hopkinson, J. Method of and means in the manufacture of piston-rings.

453,050. Vereinigte Eisenbahn-Signal-Werke Ges. Signal control arrangements for single-line tracks.

453,179. Dickson & Mann Limited, and Thornton, C. R. Railway tip-wagons.

453,205. Simpson, J. W. L. Soot blowers for boilers and the like.

453,489. Onions, J. W., and Ruston & Hornsby Limited. Ball valve seatings.

453,520. Joyce, A. E. Signal or alarm devices for use on vehicles or other machines.

453,526. **Ivens, T. L.** Method of and means for storing and utilising normally-wasted power in road and rail vehicles.

453,609. **English Electric** Co. Ltd., and Marshall, W. L. Rail vehicles such as tramcars.

453,619. Porter, H. W., and Bridge, J. T. Laminated springs.

453,666. Klima, R. Arrangement for converting a street vehicle into a rail-road vehicle and *vice-versa*.

453,692. Koy, E. Switches for portable railways.

453,737. General Railway Signal Company. Motor devices for colour-light signals.

453,775. King, J. W. Gates of railway level crossings and the like.

453,777. Soc. d'Electricité Mors. Transmission of signals to railroad vehicles.

453,870. Smith, R. H. Device for cleaning the exterior surface of boiler, evaporator, condenser, and like tubes.

453,974. Holroyd, B. D., and Owens Boiler Circulator (1930) Limited. Steam boiler circulators.

453,980. Ardeltwerke Ges. Gantry cranes.

454,000. Babcock & Wilcox Limited and Jacob, K. B. Valve mechanism for steam traps.

CONTRACTS AND TENDERS

The L.N.E.R. has placed orders for a total of 198 coaches divided as follow :—

Metropolitan-Cammell Carriage & Wagon Co. Ltd., 80 open third class coaches.

Birmingham Railway Carriage & Wagon Co. Ltd., 82 corridor third class coaches.

Craven's Railway Carriage & Wagon Co. Ltd., 22 open brake third class coaches.

Gloucester Railway Carriage & Wagon Co. Ltd., 14 corridor third class coaches.

Beyer, Peacock & Co. Ltd. has received an order from Guest, Keen & Nettlefolds Limited for one standard gauge 0-4-0 type saddle-tank shunting locomotive.

Guest, Keen, Williams Limited has received orders from the Indian Stores Department for 14 sets of broad-gauge and 16 sets of metre-gauge crossings and 50 sets of broad-gauge and 53 sets of metre-gauge switches at a total price of Rs. 53,455, delivery free, and 70 sets of acute crossings, 20 switches, 2-ft. 6-in. gauge, two tongue rails and 35 sets of spring bars at a total price of Rs. 34,393, delivery free.

The Barrow Hæmatite Steel Co. Ltd. has received an order from the Great Indian Peninsula Railway for 3,000 type E fishplates for B.H. 100-lb. rails.

The Egyptian State Railways Administration has placed the following orders :—

Atlas Carbon & Battery Co. Ltd., Léclanche porous pots. (Ref. No. E.S.R. 34,699. Total cost, £230 12s. 6d. Delivery f.o.b. London.)

Siemens Bros. & Co. Ltd., Hand micro telephones. (Ref. No. E.S.R. 34,697. Total cost, £337 10s. Delivery f.o.b. London.)

H. J. Skelton & Co., Bolts and nuts. (Ref. No. E.S.R. 3,240. Total cost, £916 6s. 5d. Delivery f.o.b. Antwerp.)

Comp. Generale d'Elect. Metallurgie, Wires and cables. (Ref. No. E.S.R. 30.291. Total cost, £720 9s. Delivery f.o.b. Havre.)

John L. Seaton & Co. Ltd., Oils. (Ref. No. E.S.R. 59,119. Item No. 1. Total cost, £1,062. Delivery f.o.b. Hull.)

Thomas Hinshelwood & Co. Ltd., Oils. (Ref. No. E.S.R. 59,199. Item No. 2. Total cost, £230. Delivery f.o.b. Rotterdam) and 158 metric tons of cylinder oil.

Shell Co. of Egypt Ltd., 580 metric tons of engine bearing oil and 525 metric tons of carriage and wagon oil.

Ets. Duchesne, Weighbridges (Ref. E.S.R. 55·218, total value £950 f.o.b. Antwerp or Marseilles.)

J. Spencer & Co. (1928) Ltd. has received an order from the Leopoldina Railway for approximately 1,400 steel spiral springs for carriages and wagons.

Ringhoffer A.G. has received an order from the Egyptian State Railways Administration for 40 petrol tank wagons at a price of £317 per wagon.

Taylor Bros. & Co. Ltd. has received an order from the Central Argentine Railway for 255 steel carriage and wagon tyres.

S.A. des Usines & Aceries Allarde has received an order from the Egyptian State Railways Administration for axle boxes (Order No. 21.561, total value £219 7s. 6d., delivery f.o.b. Antwerp).

The Associated Equipment Co. Ltd. has recently received the following orders from railway and railway associated road transport operators : British Columbia Electric Railway, 10 oil-engined Ranger vehicles ; Thomas Tilling Limited, two oil-engined Mammoth Major 8 vehicles ; Pickfords Limited, one oil-engined Mammoth Major 8 vehicle.

The South Indian Railway Administration has placed the following orders to the inspection of Messrs. Robert White & Partners :—

Wood Hempel Limited, 25¼ tons of white paint.

Mather & Platt Limited, 17 train-lighting dynamos and accessories.

Patent Lighting Co. Ltd., 68 train ventilating fans.

Pritchett & Gold & E.P.S. Co. Ltd., 323 alkaline cells for train-lighting.

Alklum Storage Batteries Limited, 323 alkaline storage battery cells.

Beckett, Laycock & Watkinson Limited, Beclawat metal louvres.

Thos. F. Johnson, carriage fittings.

John Levick, lavatory fittings.

W. & C. French has received a contract from the London Passenger Transport Board for excavating, levelling, draining, and fencing a large area of land between the Hainault and Grange Hill stations on the L.N.E.R. This will be the site of the new Grange Hill railway depot, an integral part of the £14,500,000 programme of improvement and extension in North-East London. Thousands of tons of soil will be excavated, dumped where needed and levelled off by the latest types of machine. The new depot will include the most modern cleaning apparatus, including a vacuum plant for the interior of cars and a giant washing machine for the exterior. Attractive messroom and recreation facilities will be provided for the staff. Work should begin in about a week.

Ekins & Co. Ltd. has received a contract from the London Passenger Transport Board for the construction of a canteen and office block at the Hendon trolleybus depot. Work will begin shortly. A modern brick building 93 ft. long, by 35 ft. wide, having offices, conductors' rooms, and cashiers' rooms on the ground floor and a club room and a canteen on the first floor, will be built near the garage on a vacant site facing the Edgware Road.

Ekins & Co. Ltd. has also received a contract from the London Passenger Transport Board for the reconstruction of the Edmonton tram depot to accommodate trolleybuses. The new depot will be much larger than the existing building ; it will be 384 ft. long by 288 ft. wide. On one wing there will be a two-storey block containing canteens, staff rooms, and offices. Eighty trolleybuses will be housed in the depot and there will be room for more vehicles should they be required. Work will begin within about two weeks.

Beruck & Comens (Engineers) Limited has received orders from the Indian Stores Department for totals of 82 broad-gauge crossings, 82 switches, and 82 stretcher bars, at a total price of Rs. 36,717 free delivery.

J. W. Roberts Limited has received orders for 86 sets of asbestos mattresses for locomotive boilers for the Buenos Ayres Great Southern Railway, and 14 for the Buenos Ayres Western Railway.

Burn & Co. Ltd. has received an order from the Indian Stores Department for totals of 90 acute crossings, 10 switches, four tongue rails, 22 sets of ordinary crossings, 26 broad-gauge switches, 41 metre-gauge crossings and 18 metre-gauge switches, at a total price of Rs. 90,652 delivery free.

The Egyptian State Railways Administration invites tenders, receivable by March 9, for the supply of five diesel-engined pumping sets.

The Agent, G.I.P. Railway, Victoria Terminus, Bombay, invites tenders, receivable by February 10, for the supply of locomotive boilers, DS 12 type broad-gauge and BS 1 type narrow gauge.

The Chief Controller of Stores, Indian Stores Department (Electrical Section), New Delhi, invites tenders receivable by February 13, for three vertical boilers suitable for a working pressure of 100 lb. per sq. in.

The Bombay, Baroda & Central India Railway Administration invites tenders, receivable by February 10 at the White Mansion, 91, Petty France, Westminster, S.W.1, for the supply of steel material including plates, angles, and rounds.

Tenders for the supply of £2,000,000 worth of railway material are being invited by the Jugoslav Ministry of Transport. The goods must be supplied on terms of five years' credit. The tenders were invited from German firms only on October 31 last, but it was discovered that it was against the provisions of the Jugoslav constitution to limit offers to firms of one nation only. Tenders must be submitted by April 1.

Tenders are invited by the Chief Controller of Stores, Indian Stores Department (Miscellaneous Section), New Delhi, receivable by February 8, for the supply of fishbolts and nuts, crossing bolts and fan bolts, and nuts, dogspikes and roundspikes, required for the North Western Railway. Tenders are also invited by this section, receivable by February 22, for the supply of rubber and metallic vacuum brake fittings on a running contract basis during the period June 1, 1937, to May 31, 1938.

The South African Railways & Harbours Administration is calling for tenders (Tender No. 1199) for the supply and delivery of steelwork, &c., for the construction of 30 ft. deck spans to replace existing superstructure on Port Shepstone—Harding line, and an overhead bridge at New Kleinfontein. Tenders endorsed "Tender No. 1199 for Bridgework" should be addressed to the Chief Stores Superintendent, Park Station Chambers, Rissik Street, Johannesburg, by whom they should be received by March 1.

OFFICIAL NOTICES

South Indian Railway Company, Limited

THE Directors are prepared to receive Tenders for the supply of :—
FANGBOLTS, DOGSPIKES, &c.
Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.
Tenders addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked, "Tender for Fangbolts, &c." with the name of the firm tendering, must be left with the undersigned not later than 12 noon, Friday the 12th February, 1937.
The Directors do not bind themselves to accept the lowest or any tender.
A charge, which will not be returned, will be made of 5s. for each copy of the Specification.
Copies of the Drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
27th January, 1937.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33. Tothill Street, Westminster, London, S.W.1.

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RAILWAY AND OTHER REPORTS

Metropolitan Railway Surplus Lands Co. Ltd.—The board recommends a dividend of 2¼ per cent. for the half-year ended December 31 last (making 3⅝ per cent. for the year), transferring £2,000 to reserve, and carrying forward £3,824 to next year.

Tilling & British Automobile Traction Limited.—The directors recommend a dividend of 4 per cent. for the half year ended December 31, 1936, and a further dividend of 2 per cent. for the year on the 8 per cent. participating preference shares (making a total of 10 per cent. for 1936) ; and a final dividend of 5 per cent. (making 10 per cent.) on the ordinary shares for 1936. Last May a 33⅓ per cent. share bonus was distributed to ordinary shareholders.

South Behar Railway.—After paying the dividend at the rate of 5 per cent. per annum for the half year ended December 31, 1935, a balance remained in hand of £5,278, which, with the amount received from the Secretary of State for India for the half year to June 30, 1936, and other receipts, less interest on debenture stock, and sundry other outgoings, left £14,785 to the credit of revenue account. An interim dividend at the rate of 5 per cent. per annum was paid on July 31, leaving £5,295 to carry forward. Adding £15,000 received from the Secretary of State for India for the half year to December 31, 1936, and other receipts, less interest on debenture stock, and sundry outgoings, leaves £14,865 to be dealt with. The directors recommend a dividend at the rate of 5 per cent. per annum for the half year, which will absorb £9,489 and leave £5,376 to be carried forward.

Jamnagar & Dwarka Railway.—This report is the first of the kind issued on this railway and gives a review of the combined system during the financial year 1935-36. It comprises three sections : Jamnagar State Railway 54¼ miles ; Jamnagar-Dwarka Railway, 66 miles ; and Kuranga-Okha Railway owned by the Baroda State, but worked by the Jamnagar & Darkwa Railway, 39¼ miles. Gross earnings for the year under review were Rs. 14,77,797, a decrease of Rs. 13,117 in comparison with the previous year, but working expenses were reduced from Rs. 8,54,582 to Rs. 7,89,327, and the operating ratio from 57·32 to 53·41 per cent Net earnings improved from Rs. 6,36,332 to Rs. 6,88,470, giving a return of 4·33 per cent. on capital outlay, including suspense, as compared with 4 per cent. for 1934-35. Passengers numbered 726,015 against 738,576, and the weight of goods carried was 397,378 tons against 363,420 tons.

Northern Pacific Railway.—Operating revenues for the year 1935 were $53,845,654, an increase of $2,437,879, or 4·74 per cent., in comparison with 1934, but operating expenses advanced from $41,550,813 to $44,093,600, so that net operating revenue was $104,908 lower, at $9,752,054. Net railway operating income fell from $7,915,209 to $7,726,342, and gross income from $15,452,756 to $14,959,644. The amount available for fixed charges was $14,722,716, against $15,200,388, and the fixed charges of $14,290,934 were cleared with a surplus of $431,782, against $899,406 in 1934. Freight revenue was $45,262,826, an increase of $2,057,001, or 4·76 per cent., and passenger revenue improved by $162,953, or 4·85 per cent., to $3,525,410. The increase of 6·12 per cent. in the expenses, was due, in part, to the restoration in 1935 of the balance of wage deductions. During the year four de luxe air-conditioned coaches were purchased, and air-conditioning equipment was installed in 12 coaches, 4 observation cars, and 6 dining cars. The average mileage of road operated was 6,725.

Chicago, Milwaukee, St. Paul & Pacific Railroad.—Railway operating revenues for the year ended December 31, 1935, amounted to $92,473,793, an increase of $4,614,001 over 1934, or 5·3 per cent. Railway operating expenses ($76,416,517) increased by $6,760,970, or 9·7 per cent., leaving a net revenue from railway operations of $16,057,276, which was $2,146,969 lower than for 1935. Railway operating income amounted to $10,038,180, a decrease of $1,737,565, and net railway operating income was $4,723,983, a decrease of $1,815,071. The income available for fixed charges was $6,035,714, a decrease of $1,816,421, and the total fixed charges were $14,900,777. Revenue from passenger traffic in 1935 amounted to $6,041,992, an increase of $425,042, or 7·6 per cent., over 1934. The Hiawatha trains introduced on May 29, 1935, between Chicago and the Twin Cities, earned during their first seven months of operation a net revenue of $2·18 per train-mile. Freight revenues ($77,311,239) improved by $3,928,696. The route-mileage in operation at the end of the year was 11,123. A total of 81 miles of branch lines was abandoned during the year.

Leyland Motors Limited.—The gross profit for the year to September 30 last amounted to £551,951 (against £444,919 for 1934-35), and the profit before providing for income tax was £463,012. A transfer of £150,000 (against £100,000) is made to general reserve, and an ordinary dividend of 20 per cent. is recommended (against 17½ per cent.). The sum of £51,531 is to be carried forward.

National Provincial Bank Limited.—The directors report that after making provision for rebate of discount on current bills and after making a transfer to the credit of Contingencies Account, out of which account provision for all bad and doubtful debts has been made, the net profit for the year 1936 amounts to £1,770,173, to which has to be added the sum of £922,406 brought forward from last account, making a total of £2,692,579, which has been appropriated as follows : Interim dividend of 7½ per cent. subject to tax (£168,852) paid in July last, £710,956 ; a further dividend of 7½ per cent. subject to tax (£168,852) payable January 29, 1937, £710,956 ; transferred to pension fund, £200,000 ; transferred to bank premises account, £100,000 ; balance carried forward to 1937, £970,667. The total number of branches and agencies now open is 1,336.

Forthcoming Meetings

Feb. 9 (*Tues.*)—**Oldham, Ashton-under-Lyne and Guide Bridge Junction Railway Company** (Ordinary Annual), King's Cross station, London, at 11.15 a.m.

Feb. 9 (*Tues.*)—**Whitechapel & Bow Railway Company** (Ordinary General), 55, Broadway, Westminster, S.W.1, at 2.45 p.m.

Feb. 10 (*Wed.*)—**Fishguard & Rosslare Railways & Harbours Company** (Half-Yearly Ordinary), Paddington Station, W.2, at 1 p.m.

Feb. 11 (*Thurs.*)—**Weymouth & Portland Railway Company** (Ordinary Half-Yearly General), Regis House, King William Street, E.C.4, at 12.30 p.m.

XUM

Railway Share Market

Conditions in the stock and share markets generally have been less active and Home railway stocks were again moderately reactionary, awaiting next month's dividend decisions. The past week's traffic receipts were not such as to stimulate buying, but they were regarded as not unsatisfactory. Although the net increase is only £7,000, receipts from coal declined by as much as £36,500. Comparison is still with a period last year when there were exceptionally large movements of coal, which was more than off-set by an improvement in goods traffic.

L.M.S.R. ordinary was better at 32¼ following news of last week's traffic gain of £16,000 which was regarded as satisfactory. The 4 per cent. preference and 1923 preference both remained rather out of favour, despite the attractive yields offered and general confidence that the results will show their dividend requirements to be covered by a good margin. Southern issues were not much affected by last week's traffic decrease of £4,000. In fact the deferred was reported to be in good demand around 26½, but the preferred ordinary was out of favour and made the lower price of 97¾ despite the good yield offered. Great Western ordinary was lower at 61½ on the past week's traffic decline of £10,000. There was a rather steadier trend in L.N.E.R. issues, partly owing to the very small traffic increase for the past week. Better demand was reported for the first preference, but the second preference was sold on conflicting views as to the dividend outlook. The general assumption is that although not more than a fractional payment is possible, it is likely that if a modest distribution is recommended, the stock may show a sharp response in price. Debenture stocks of the main line railways were slightly lower in sympathy with the trend in British Government securities and fixed-interest-bearing issues generally. Transport "C" was better.

Among foreign railway stocks there was not a great deal of interest in those of the Argentine railways, apart from demand for Central Argentine and B.A. Gt. Southern ordinary stocks on the excellent traffics. Preference stocks of the last-named railway were bought and made slightly higher prices, but fractional losses were shown by the debenture stocks. B.A. Pacific issues were moderately reactionary. Cordoba Central first debentures have shown a further sharp decline. Elsewhere, San Paulo and Antofagasta declined sharply and Leopoldina was subject to profit-taking after its recent improvement.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1935-36	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1935	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1936	Prices: Lowest 1936	Prices: Jan. 27, 1937	Prices: Yield % (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	834	24.1.37	16,900	+ 2,430	4	50 610	55,680	— 5 070	Ord. Stk.	25	15¼	27	Nil
	Argentine North Eastern ..	753	23.1.37	7,177	+ 849	50	270,557	236,399	+ 34,158	,,	12	2	11	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	A. Deb.	54	45	80	5
	Bolivar	174	Dec., 1936	5,600	+ 900	52	74,200	71,300	+ 2,906	6 p.c. Deb.	9	5	7½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	16	11½	16½	3
	Buenos Ayres & Pacific ..	2,806	23.1.37	110,298	+ 17,407	30	2,440,489	2,299,103	+ 141,386	Ord. Stk.	17½	6	14½	Nil
	Buenos Ayres Central ..	190	9.1.37	$152,800	+ $61,000	28	$4,022,300	$3,347,600	+ $674,700	Mt. Deb.	3 1/2	11	39½	Nil
	Buenos Ayres Gt. Southern	5,084	23.1.37	229,094	+ 77,390	30	3,809,509	3,681,449	+ 125,060	Ord. Stk.	31¾	13¾	31	Nil
	Buenos Ayres Western ..	1,930	23.1.37	65,571	+ 14,925	30	1,358,205	1,267,482	+ 90,723	,,	29¾	11	27	Nil
	Central Argentine	3,700	23.1.37	185,608	+ 49,042	30	4,315,167	3,578,556	+ 736,611	,,	3 9/32	8¾	30	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	21	4½	17	Nil
	Cent. Uruguay of M. Video	273	16.1.37	14,181	+ 1,541	29	354,558	291,075	+ 63,483	Ord. Stk.	7¾	3	12	Nil
	Do. Eastern Extn.	311	16.1.37	2,835	+ 445	29	60,408	52,999	+ 7,409	—	—	—	—	—
	Do. Northern Extn.	185	16.1.37	1,757	— 289	29	41,218	38,575	+ 2,643	—	—	—	—	—
	Do. Western Extn.	211	16.1.37	1,058	+ 50	29	28,173	24,129	+ 4,044	—	—	—	—	—
	Cordoba Central	1,218	23.1.37	30,580	+ 5,020	30	973,560	884,090	+ 89,470	Ord. Inc.	5	1	5½	Nil
	Costa Rica	188	Nov., 1936	19,592	+ 6,242	22	91,581	68,699	+ 22,882	Stk.	36½	32	36	5 9/16
	Dorada	70	Dec., 1936	17,400	+ 3,400	52	173,900	144,700	+ 29,200	1 Mt. Db.	107	101½	104½	5 5/4
	Entre Rios	810	23.1.37	15,062	+ 5,168	30	391,785	337,672	+ 54,113	Ord. Stk.	17	6	15	Nil
	Great Western of Brazil ..	1,082	23.1.37	10,100	— 700	4	32,600	37,100	— 4,500	Ord. Sh.	1/2	5/16	5/4	Nil
	International of Cl. Amer...	794	Nov., 1936	$426,881	+ $11,920	48	$4,650,651	$4,258,842	+ $391,809	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	1st Pref.	1/2	-/6	1/2	Nil
	La Guaira & Caracas ..	22‡	Dec., 1936	6,225	+ 2,075	52	56,700	45,345	+ 11,355	Stk.	9	3	7½	Nil
	Leopoldina	1,918	23.1.37	21,575	+ 2,808	4	70,250	62,155	+ 8,365	Ord. Stk.	10½	3½	8	Nil
	Mexican	483	21.1.37	$284,300	+ $37,000	3	$837,600	$716,800	+ $120,800	,,	1¼	1/4	1½	Nil
	Midland of Uruguay ..	319	Dec., 1936	8,764	+ 814	26	49,941	39,314	+ 10,627	,,	1½	1/8	1/2	Nil
	Nitrate	397	15.1.37	6,781	— 3,170	2	6,781	9,951	— 3,170	Ord. Sh.	63/6	41 9	2¾	Nil
	Paraguay Central	274	23.1.37	¢2,677,000	+ ¢435,000	30	$78,316,000	$67,544,000	+ $10,722,000	Pr. Li. Stk.	85	71	81½	7¾
	Peruvian Corporation ..	1,059	Dec., 1936	81,512	+ 3,015	26	490,785	454,297	+ 36,488	Pref.	15	9	13	Nil
	Salvador	100	16.1.37	¢45,250	+ ¢9,500	29	¢462,758	¢447,446	+ ¢15,312	Pr. Li.Db.	18	16	18½	Nil
	San Paulo	153½	17.1.37	27,933	— 1,868	3	79,576	77,258	+ 2,318	Ord. Stk.	86	46½	87½	2/8
	Taltal	164	Dec., 1936	4,090	+ 35	26	20,900	20,700	+ 200	Ord. Sh.	1 15/32	14/-	1¼	8
	United of Havana	1,353	23.1.37	23,249	+ 2,394	30	486,333	469,564	+ 16,769	Ord. Stk.	3¼	1	4	Nil
	Uruguay Northern	73	Dec., 1936	1,442	+ 327	26	6,481	4,830	+ 1,651	Deb. Stk.	5	3	8	Nil
Canada.	Canadian National	23,564	21.1.37	659,070	+ 74,430	3	1,891,991	1,708,043	+ 183,947	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	76	51	76½	5¼
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	10 4¾	99¾	101½	3 15/16
	Canadian Pacific	17,223	21.1.37	474,200	+ 40,600	3	1,388,400	1,244,200	+ 144,200	Ord. Stk.	16¾	10 15/16	16	Nil
India.†	Assam Bengal	1,329	31.12.36	42,172	+ 6,761	39	977,938	934,223	+ 43,715	Ord. Stk.	8 3/4	8 21/4	9 41/2	3 9/16
	Barsi Light	202	31.12.36	3,645	— 682	39	87,165	106,627	— 19,462	Ord. Sh.	7 7/2	6 5/2	6 5/2	7 5/8
	Bengal & North Western ..	2,107	10.1.37	79,394	— 2,856	14	768,926	722,641	+ 46,285	Ord. Stk.	319	292 5/8	310	5 15/16
	Bengal Dooars & Extension	161	10.1.37	2,978	— 919	40	104,520	110,814	— 6,294	,,	127 1/2	118	116 1/2	6
	Bengal-Nagpur	3,268	10.1.37	135,675	— 52,616	40	4,598,856	4,966,764	— 367,908	,,	104	100 1/4	100 1/2	4
	Bombay, Baroda & Cl. India	3,072	20.1.37	307,500	+ 55,500	41	6,866,175	6,498,750	+ 367,425	,,	114	110 1/2	110 1/2	5 7/16
	Madras& Southern Mahratta	3,229	3.12.36	222,075	+ 37,386	39	4,190,009	4,000,399	+ 118,610	,,	116 1/2	108 1/2	108 1/2	7/8
	Rohilkund & Kumaon ..	572	10.1.37	17,118	— 952	14	139,512	133,465	+ 6,047	,,	311	286	310	5 15/16
	South Indian	2,532	31.12.36	132,370	+ 19,201	39	3,018,147	2,962,213	+ 55,934	,,	107 1/2	102 5/16	101 1/2	5 7/16
Various	Beira-Umtali	204	Nov., 1936	68,789	+ 4,610	9	137,294	129,926	+ 7,368	—	—	—	—	—
	Bilbao River & Cantabrian	15	Dec., 1936	1,128	— 388	52	16,077	18,470	— 2,393	—	—	—	—	—
	Egyptian Delta	620	10.1.37	7,864	— 203	40	198,541	197,891	+ 650	Prf. Sh.	2¼	1 5/8	1 5/3	6 1/16
	Great Southern of Spain ..	104	29.8.36	568	— 2,514	35	33,623	62,623	— 28,994	Inc. Deb.	1 1/2	1/8	3/2	Nil
	Kenya & Uganda	1,625	Dec., 1936	207,131	+ 8,585	52	2,526,328	2,384,923	+ 141,405	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50 1/2	37	47	7 7/16
	Mashonaland	913	Nov., 1936	120,282	+ 18,563	9	245,549	213,702	+ 31,847	1 Mg. Db.	10 5 1/2	101 5/16	106	4 11/16
	Midland of W. Australia ..	277	Nov., 1936	13,196	— 1,323	22	67,761	63,781	— 1,520	Inc. Deb.	97	95 1/2	96	4 1/8
	Nigerian	1,900	5.12.36	85,945	+ 23,123	35	1,425,326	1,118,091	+ 307,235	—	—	—	—	—
	Rhodesia	1,538	Nov., 1936	213,377	+ 25,550	9	413,341	390,521	+ 52,820	4 p.c. Db.	107	103 1/2	105	3 15/16
	South Africa	13,263	2.1.37	584,782	+ 25,401	40	24,352,755	22,578,516	+ 1,774,239	—	—	—	—	—
	Victoria	4,728	Sept., 1936	790 3 4	+ 984	13	2,242 629	2,238,853	+ 3,776	—	—	—	—	—
	Zafra & Huelva	112	Nov., 1936	16,703	+ 6,796	48	97,316	124 029	— 26,7 3	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. ‡ ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.